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C. 176.

To Dr. H. Ophuls with the  
Author's Compliments and Christmas  
Greetings.





DR. R. G. ECCLES AND WIFE  
In Moorish costume, in the Alhambra, Spain

# Touring the Lands Where Medical Science Evolved

THE MEDICAL FORTNIGHTLY

ROBERT G. ECCLES, M. D.  
BROOKLYN, N. Y.



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THE MEDICAL FORTNIGHTLY  
1910

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## TOURING THE LANDS WHERE MEDICAL SCIENCE EVOLVED.

### GRECIAN.

WE began our first letter to the MEDICAL FORTNIGHTLY in Turkey and ended our last one in Yokohama. The trip across the Pacific Ocean and through the United States, being of little interest to readers, is purposely excluded. Our tour, of course, began at Brooklyn and ended at the same place, but the voyage across the Atlantic, interesting as it could be made, must be excised from our story for the purpose of making room for still more interesting matter. Our ship to Europe was called the "Barbarossa," and this name gave me the cue to considerable information that directed our course, and it has likewise led to the writing of this and the two succeeding supplementary letters.

The chronological necessities of following the evolution of medicine make it necessary for our present description to begin in far off Catania. This city will be found at the foot of Mount Etna, in Sicily. An Italian ship on which we were sailing had to put in here for three days to escape the "Euroky-lon" of the Acts of the Apostles. The English, at Malta, call it a "gregale." St. Paul was wrecked by this form of tempest. Ulysses, from whom Grant was named, met a like fate here. The day before the tempest began our ship, the Bormidia, had steered past the fabled Scylla and Charybides taken us on board within sight of these danger points,

at Messina, and was on its way to Athen. We had just reached Messina from Syracuse and had wandered through the street in which Archimedes ran while crying out "Eureka," and where the sterling honor and true friendship of Damon and Pythias had been tested by Dionysius. We had seen, heard, and verified the power of that wonderful echoing grotto—the Ear of Dionysius—that Archimedes is credited with having constructed, while speculating upon how to move the world with lever and fulcrum of sufficient size. There is probably no where else on earth an echo-chamber capable of so perfectly reproducing whispers as audible sounds. To the medical man, as such, the tyrant Dionysius is the central figure of the place in that he was among the first to desecrate the sacred grove of Esculapius. Not daring to allow his impiety to carry him to the extent of removing the entire gold and ivory image of the god from Epidaurus to Syracuse he instructed his soldiers to cut off the beard of precious metal and take that. He justified this act by saying that as Apollo, the father of Esculapius, had no beard it was unbecoming in the son to wear such an appendage. Being on our way to Epidaurus we have begun this recital at Catania, that was then within the dominion of Syracuse, and that the tempest had forced us to visit a third time. We had been there twice before. Our first stopping place, after leaving Sicily, was Candia or Crete. We spent half a day in the city of Caneé studying the motley crowds of Turks, Greeks, Latins, Arabs and Africans. The island is almost exactly midway between Europe, Asia and Africa and was one of the earliest nuclei from which civilization radiated. Long before the time of Greek medicine Crete had absorbed that of Phrygia, Egypt, and Phoenecia and sent it to Greece. Those who play the game of checkers may be interested in learning that the oldest checker-board found in the world was dug up from Cretan ruins. Egyptian objects bearing dates of 1500 B. C., have been unearthed at Crete. The earliest evidence of the use of carefully

squared stones in building, of colored frescoes and plastic decorations on walls, of sculptured marble, and of brightly decorated pottery comes from Crete. It took our steamship about eighteen hours to take us from Canee to the Pyreus, the latter being the port of Athens.

We reached Athens at about 1 p. m. and scarcely had we found a room in the Hotel d'Angleterre than we secured a guide and sallied forth to stand on Mars' Hill and the site of the Acropolis. The dream of a life time was about to be realized in fact. For nearly half a century had we longed to stand there, but this was the first time we had been able to go and enjoy it. Lord Byron echoes our feelings when he says:

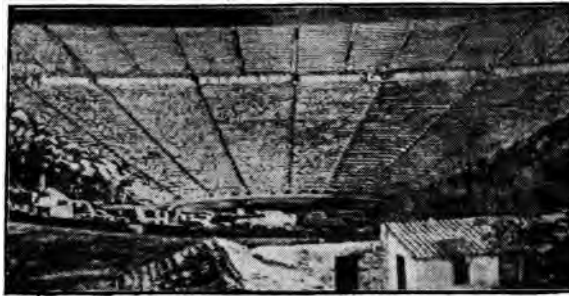
"Where'er we tread 'tis haunted holy ground;  
No earth of thine is lost in vulgar mould,  
But one vast realm of wonder spreads around  
And all the muses tales seem truly told,  
Till the sense aches with gazing to behold  
The scenes our earliest dreams have dwelt upon."

It would be impossible to put into words the feelings and thoughts that welled into consciousness as we stood where Paul, where Alexander, where Socrates, where Plato, where Aristotle, and where multitudes of others of the world's greatest intellects of antiquity had stood and addressed the multitude. As we gazed on the ruins we impulsively repeated:

"Look at this spot, a nation's sepulchre!  
Abode of gods whose shrines no longer burn."

Facing us, on the hill beyond, and facing Paul as he cried out, "Ye men of Athens," is the dismal cave-cell where Socrates drank the hemlock in obedience to the decree of his judges, 399 years before the birth of Christ. He had been found guilty of impiety and of blaspheming these gods "whose shrines no longer burn." He had to die as a penalty because he dared to see truths the multitude failed to see. One of these truths was, "The proper study of mankind is man." Thus stated it put a new shade of meaning on what might be called a statement of their scriptures. After taking the poison his last words were: "Crito, I owe a cock to Esculapius;

will you remember to pay the debt?" Crito replied: "The debt shall be paid." His dying thought was the debt he owed for medical services. How many of our patients, in these Christian days, would be as thoughtful of their doctor's bills when facing dissolution? His ethical system, which he daily tried to inculcate into the Athenian mind, was condensed into the two aphorisms, that "Vice is ignorance," and that "Virtue is knowledge." He held that if one fully knew the consequences to themselves and to others of the acts they do evil would be at an end. The great Plato, his friend and student, con-



Theatre of Esculapius at Epidauros.

tinued to teach the same principles for years after, but while Socrates was sacrificed to the bigotry of religion Plato was permitted to live to a ripe old age. During the many years of his life he was a diligent student and a voluminous writer. His works on philosophy, medicine, and physiology have profoundly affected the science of our day. As a philosopher he paved the way for Berkeley and the idealists. As a physician he caused Aristotle, his pupil, to become a pioneer thinker and so to clear away the rubbish that time always heaps up. In opening up the new field Aristotle, necessarily, had to break away from the intuition doctrine of his master. He discovered that solid knowledge results from investigation and experiment. He gave us our first comparative anat-



omy and physiology, through dissecting of animals. His pupil, Alexander the Great, at a later date gave us Alexandria with its medical college and great library, much of which was medical. The intellectual progeny of Socrates thus brought so much of good to the world that, with Charles Mackay, we can say:

"Pace in thy cell old Socrates, merrily to and fro,  
Trust to the impulse of thy soul and let the poison flow.  
But yet the world goes round and round, and the genial  
seasons run  
And ever the wrong is proved to be wrong, and ever is  
justice done."

Our stay in Athens was one round of delightful sight-seeing both among the ruins and in the new city. But to see Athens is not to see Greece, so after proper arrangements with our hotel courier we were again quickly on the wing. From the Pyreus we took ship for Itea and were soon sailing in the very waters where the fleet of Xerxes was put to rout, the Persian princes destroyed, and European civilization saved in its budding infancy from being swamped by the barbarous hordes of Asia. Here is Salamis and yonder Mount Aegalis, where Xerxes sat on his silver footed throne and helplessly watched his armada of 1000 ships compelled to flee before 400 of those of Greece. With nearly one million soldiers around him he was tied to the shore in helpless despair. "All is at stake" was the watchword of the Greeks, but even they did not know that all of civilization was at stake and in their keeping. Aeschylus, the Persian poet, justly declared that "In Salamis the power of the Persians lies buried." After passing Salamis we were soon down deep in the gorge of the great Corinthian canal and looking high up at its banks, a small reminder of our greater work at Panama. Our steamer the Pylaroze, almost filled the channel from bank to bank, as high above our heads a railway train rolled over on the suspended bridge. As soon as we had cleared the canal we were in the Gulf of Lepanto with our bow pointed in the direction of the Bay of Salona. As we neared this the sun was setting in the golden west and soon a crimson glow covered

the sky, through which appeared the pretty crescent of the new moon. Not a cloud nor semblance of a fog could be seen anywhere. Overtowering the scene to the right, and forward of the ship, was the snow-capped peak of Parnassus. Could mortal be other than enthused at such a sight. Here in majestic beauty, framed in crimson, gold, and blue, capped by a diadem of purest white, stood that home of the Muses that had for ages been extolled by authors, raved about by poets, and symbolically depicted by artists. Abridging Childe Harold we get this picture:

"Oh thou Parnassus! whom I now survey  
In the wild pomp of mountain majesty!  
Oft have I dreamed of thee! whose glorious name  
Who knows not, knows not man's divinest lore!  
When I recount thy worshippers of yore  
I tremble, and can only bend the knee;  
Nor raise my voice, nor vainly dare to soar,  
But gaze beneath thy awful canopy  
In silent joy to think—at last I look on thee!"

We landed at Ites at dusk and found a carriage in waiting to take us nearly 2000 feet up the mountain to the hotel at Delphi. As we were the guests of the Hotel d'Angleterre of Athens, during our entire tour, they telegraphed ahead of us to every point and arranged for our comfort. A climb of nearly two hours, through canyons, along chasms, and among the wildest of mountain scenery, which it was too dark for us then to see, brought us to a warm supper, comfortable bed, and charcoal braziers. There are no fires or fireplaces in Greece. Everywhere we had to warm ourselves over a little mass of glowing charcoal in a brazier. Next morning we made an early start to visit what was once the most famed spot upon our planet, where empires had their destinies proclaimed, where kings trembled at the words of the oracles, where the stream of human progress was directed by a whim, and where went forth decrees that we, today, are still enthralled by, without being conscious of the fact. From here too the rill of early medical lore started on its course to that mighty stream which is now biological science. Making our way through the crumbling ruins of

shrines and statues, priestly homes and treasures, sculptured blocks and the earthquake rent shreds of the rocks of Parnassus, we were at last able to mount that priceless archeological treasure, the tripod stone of the Sybil. The carved marks of where the legs of the gold tripod rested are clearly discernible on its surface. Before it lies the wreckage of the mighty temple, near the centre of which is the supposed crevice, the vapors from which brought the sought for inspiration. The numerous treasures attest the religious and political strength of the priests. In the Sermon on the Mount we are told that "Where our treasure is there will our heart be also." The gold, the precious stones, the spoils of war, the richest treasures of art were gathered here. When fragmentary Greece was a tempting prey to the barbarian hordes of Asia the Amphictyony of Delphi was their tower of strength. This federal centre, like our Congress and Senate, gradually linked the helpless little States together, impressing upon them the value of *voluntary union*. Step by step out of this grew our great modern republics. The priests of Delphi are believed to have come originally from Crete and, as already stated, the Cretans traced their inspiration to Phrygia. As every American should know the Phrygians were the world's original freemen. Our Goddess of Liberty still wears the Phrygian cap—the cap of liberty. That old spark of freedom, from unknown depths in prehistoric time welled up again in the Delphic Amphictyony. The accumulated wealth of centuries that was gathered here and at Olympia came, in time, to be a tempting bait to cupidity and when, at about the time that Christ was born, faith in Apollo weakened, the Delphic priests lost their grip upon the masses and thus gave Sulla, Nero, and finally Constantine an opportunity to come and rob them. Before that even the emperors, and other rulers of Rome, were glad enough to turn the ear of faith toward the utterances of the Delphic oracle. During the great pestilence of B. C. 291 an expedition

was sent from Rome to Delphi. Ovid says:

"In vain were human remedies applied,  
Wearied with death they seek celestial aid,  
And visit Phoebus in his Delphic shade."

By this time, however, an evolution had taken place. Apollo, the god of health, had relinquished the healing art to his son, Esculapius. The Delphic priests, having assumed the higher function of healing the ailments of States, gave up, in part, that of healing men. In ancient times the priests were the physicians, but then as now an overwhelming pressure of work compelled a division of labor. The oracle, therefore, replied to the Roman embassy:

"Relief must be implored and succor won  
Not from Apollo, but Apollo's son.  
My son to Latium borne shall bring redress;  
Go with good omens and expect success."  
—Welsted's Ovid.

Some idea of the great antiquity of the Delphic oracle can be had from the fact that 900 years before the birth of Christ Iphitos of Elis and Lykourgos of Sparta consulted them regarding how best to benefit the manhood of Greece, and were told to go to the Olympian plains and start the health-bestowing games that have since ramified the whole earth. So to them, in a measure, we owe the very beginnings of hygiene and preventive medicine. In the vestibule of the temple were engraved the best mottoes of the seven sages and in conspicuous places were placed "Moderation in All Things" and "Know Thyself." Back toward the mythical period Croesus (about 600 B. C.) consulted the oracle, not too wisely, and is said to have received from Apollo the gift he most craved—the power of converting everything he touched into gold. It proved to be a fatal gift for him.

A few yards from the temple is a cleft in the mountain, from which flows the Castalean Fountain—the original holy water and baptismal font. Before entering the temple every pilgrim had to sprinkle his face and body with this water. Ovid describes this sacrament in these words:

"To the pure precinct of Apollo's portal  
Come, pure in heart, and touch the lustral wave;  
One drop sufficeth for the sinless mortal;  
All else, e'en ocean's billows cannot lave."

In the museum we saw the original Omphalos—a stone in the shape of half of an egg, that originally marked the centre of the temple and what was claimed to be "the navel of the earth." Boston speaks of itself as "the hub," but the ancient Delphians called theirs "the navel." Tradition says that Apollo sent forth two eagles to circle the earth. Both were started simultaneously and both reached the Omphalos at the



Temple of Health at Bassae (2300 years old).

same instant, although flying with the same speed. There is a suggestiveness of a round earth in this, and the Omphalos slightly corroborates this suggestion. The carvings on its surface are wonderfully like little globes with lines of latitude and longitude upon them. The place this stone occupied tradition likewise declares was the original spot where Apollo, when but a few days old, slew the python or dragon that was devastating that part of the world. He was thus represented as the first destroyer of the great type of human evil and danger. His son, Esculapius, had the subdued serpent as a representative of his power to conquer disease—the product of the serpent. The Old Serpent being slain the younger progeny were at his mercy in defiance of their venom. On the Halos,



or thrashing floor, near the temple, a festival was held every seven years to commemorate this destruction of the serpent. Much has been said about the humbuggery practiced upon the public by the Delphic priests. It is said that they had secret emissaries in every court and agents in every place where pilgrims came from to visit the temple, and that through these they gained, in advance, the knowledge which they needed in constructing their replies. While to a superficial thinker this would probably prove duplicity, to one who goes deeper into the subject and understands human nature well it would be evidence of sincerity. An institution of that kind could not have lasted for so many centuries and won such favor in the eyes of the world if the priests had been mere charlatans. They must have been as sincere as were the worshippers, or as are the preachers of today. Interpreting nature in a natural manner inspiration was deemed natural. They saw it as only coming after they had exhausted the powers the gods gave them to get truth. We do not think of accusing a Christian neighbor of hypocrisy, because he prays: "Give us this day our daily bread," and then proceeds to work for it. The principles are identical.

Having seen Delphi we proceeded to Patras. Nearing the latter place we were in the region of many historical crises and romances. Before us lay the islands of Ithaca and Santa Maura. The first named was the home of faithful Penelope, and on the shores washed by the waves of these waters she daily stood for ten long years watching for the return of her soldier husband, Ulysses. On the second, the Leucadian Rock faced our ship, and from its summit love-sick Sappho, the world's greatest woman poet, hurled herself into these waves, 600 years before the Christian Era. To our right, and washed by the waves of our propellor, lies Missolonglin where England's great Byron breathed his last. Of Sappho he said: "Could she not live who life eternal gave?" We can only repeat the same sentiment of him. In mockery of

Penelope's faithfulness to a husband, these same waters saw the wanton, Cleopatra, take fright, order her galleys to fly and leave Marc Antony to suffer defeat. Coming still nearer our own day, and in this very sea, Don John's Holy Armada, composed of ships from every part of Europe, faced and put to flight Turkey's threatening power. What Xerxes was to Greece, at Salamis, Ali Pasha was to all Europe at Lepanto. This began the end of that power that threatened to Mohammedanize the earth and that is now only represented by the so-called "sick man" of Europe. Patras is chiefly interesting to tourists as the place where the patron saint of Scotland—St. Andrew—was crucified on an X-shaped cross. From there our route lay southward to famous Olympia. For more than 1000 years this place had been famous for its games. The Greeks reckoned time by these games, as we do by the birth of Christ. They occurred every four years, this being called an Olympiad. While the games were on no war could occur between Greek States, as then the truce of the "Ekecheiria" or "hand-staying" pledge; "The peace of God" was on the people. Only free-born Greeks of unsullied character were permitted to take part in any of the games. There was foot racing, horse racing, chariot racing, javelin throwing, quoit throwing, disc throwing, wrestling, boxing. Great orators came here to speak to the people. Kings and emperors made it their holiday rendezvous. Plato, Pythagoras, Herodotus, and many other great men, were here received with honor. Victors in the games, their relatives, and families were recipients of the greatest distinction. A branch from an olive tree, said to have been planted by Hercules, was presented to each as the first token of universal favor. To be the possessor of such a branch was deemed more honorable than to be the owner of a crown. They were banqueted and feasted wherever they went, triumphal receptions followed their movements, and those receiving the highest distinction were exempted from taxation and had their

statues carved in parian marble and placed near the gods. The grounds, for miles, were covered with costly treasure houses, shrines, temples and statues. The statue of Zeus was so fine that it was counted one of the Seven Wonders of the World. Lysias called Olympia "The fairest spot of Greece." As at Delphi the accumulated treasures were so great that a kingdom could have been bought with them. The best works of art of their best artists were found here and at Delphi. What is probably the best preserved of ancient statues—the Hermes of Praxiteles—was found here buried in the mud of the overflowing river. It is now in the museum on a nearby hill. It is declared to be the most valuable of all the discoveries made at Olympia. So perfectly was it protected that the sandal thongs still show the gilding and red coloring. It has been pronounced the most perfect expression of manly beauty that has reached us from antiquity. The caduceus is grasped by the left hand. This symbol is now used by the Public Health and Marine Hospital Service of the United States. The staff means authority, the wings celerity, and the conjugating serpents wisdom, knowledge and fecundity. Hermes was the same to the Greeks and Egyptians as Mercury was to the Romans, the winged messenger of the gods. He was worshipped as the patron god of merchants, travellers, news purveyors and seamen. Praxiteles, the sculptor of the Olympian Hermes, was one of the most celebrated artists of antiquity. He placed a number of statues both at Delphi and Olympia, but chose as his model of female beauty the courtesan Phryne, he being one among her many lovers. She sat for the celebrated Cynidian Aphrodite that Pliny declared was the most beautiful statue in the world. She likewise sat for Apelles' great painting of "Aphrodite Rising From the Sea." From poverty she rose to such wealth that when Alexander the Great destroyed the walls of Thebes she agreed to rebuild them if they would let her place over one of the gates, "Destroyed by

Alexander, Restored by Phryne the Courtesan." Like Socrates, she was accused of impiety and blaspheming the gods, but unlike Socrates, she won over her judges, by displaying her beauty, and escaped. Justice in ancient Greece was not much different from what it is today. After leaving Olympia we had the most fatiguing journey of our entire tour. We started at 4 a.m., for a two hours ride by train, after which we journeyed by horse till 11 p. m., over the wildest kind of mountain roads with, in places, not even a trail to be seen. The saddles were of the crudest pattern and the horses mere workers on mountain farms. Good horses and saddles had been telegraphed for and would have met us, but that a terrific thunder storm had made the fording of the rivers impossible by the usual route. Our mountain climb was made in order to get to the head waters of these swollen streams and the steeds were hired from the poverty-stricken farmers. We carried our provisions on pack animals, in regular Rocky Mountain fashion, and when we stopped to eat the natives gathered around to gaze at the extravagant living of the "lords" who could afford to eat meat, chicken, eggs, and pastry with white bread, while they could only afford rye bread, potatoes, a little salt, and a drink of water. Such, according to our guide, were the comments made. The only places where our horses could be persuaded or pounded into going faster than a walk was down a hill, and then the jolting was terrible. Behind us went the owners of the animals shouting at them, hour after hour, "Yaw! Yaw! Yawlow!" For days we could not get that cry out of our ears. When we reached Andhrtsainae we put up at a private residence, the people of which had been looking for us two hours earlier. Next morning I asked my good wife what she now thought of Douglas Jerrold's statement, that the best thing for the inside of a man was the outside of a horse. Her reply was: "It may be all right for a man, but it certainly is not for a woman and, besides, medicine should never be given in such toxic doses." The

trip, had it been shorter, and, so, less fatiguing, would have been a delightful one. The scenery was magnificent. We had frequent peeps off into the Gulf of Arcadia and the Ionian Sea, with their many green islands. Our path was strewn with a wonderful wealth of beautiful wild flowers. We had to push our way through numerous groves of tall arbutus and made ourselves almost sick eating the delightful berries of this Grecian shrub. On the same bush hung great masses of ripe and therefore, bright crimson ones, with equally large masses of less ripe orange ones. Mixed among these were fragrant flowers of the purest white so that with the evergreen



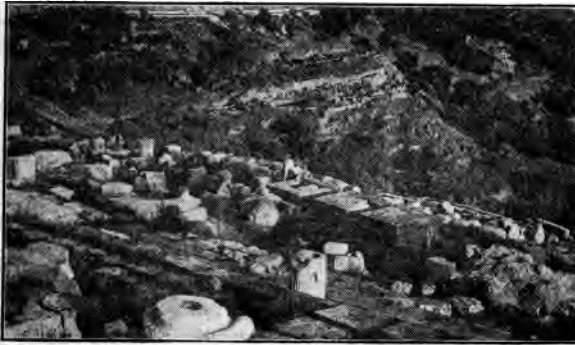
Prison of Socrates, Athens

leaves they presented to our unaccustomed eyes a most striking and most wonderful combination of pretty colors. Toward night we were beset with mosquitoes, thus reminding us of a recent claim, that the fall of Greece, to its present low state, resulted from the malaria that these mosquitoes brought to this country. Next day our trip was again on horseback, but this time we had better horses and a shorter ride.

We had come into this part of the country to see one of the best preserved, very old temples in all of Greece. It stands on the top of a high mountain, far away from all civilization, and has stood there for over 2300 years. There never has been anything else there but itself. Toiling thousands of Greeks carried the marble and metal from distant regions and the limestone from far down the mountain, with which to build it.



It was a large and beautiful structure and its architect built the Parthenon at Athens. The fact of its being dedicated to the god of health, and that it was a thank-offering of the people of the region to that god for saving them from a plague that about 430 B. C. devastated Athens, makes it doubly interesting to the medical man. Pilgrims seeking for health had to climb into this airy, breezy region, on the top of this lonely mountain to get it. No doubt Apollo heard and favorably answered the prayers of many. After seeing this remarkable structure our next prospec-



The Gymnasium at Delphi.

tive point was the great temple of Esculapius at the sacred grove of Epidaurus. We were two days in getting there, a good part of the time being spent in a carriage, rolling through the far famed Arcadia. It is certainly a very pretty pastoral region, but we could see nothing more peaceful, more full of the bliss of simplicity, or in any way more attractive than in many another such spot in our own country. The strange costumes of the people appeared to be more worthy of remark than any other thing. The men looked for all the world like ballet-girls on a stage. Their short skirts, puffed out around the region immediately above the knees by a multiplicity of short petticoats, would have seemed extremely odd had women been the wearers. To be worn by men seemed the very acme of

absurdity to us. To see them carrying strings of beads and telling them off with their fingers made us think they were using them for prayers. We were told that most of the men of Greece use these beads merely to keep their fingers busy and to be fashionable.

Before reaching the Hieron, or sacred grove of Esculapius, we passed through Karytaena, Megalapolis, Tripolis, Boleta, the ruined city of Palantion, Argos, and Naupalia. The feudal castle of Karytaena is a wonderful sight, standing as it does, surrounded on three sides by a continuous precipice of over 1000 feet, and that is formed by the curve of the foaming waters of the Alpheois River. In plain sight, to the north, is Mount St. Elias where tradition says Rhea, the wife and sister of Chronos, gave birth to Zeus. Chronos is their god of time. Palantion is said to be the original home of Evander the first colonizer of what became our Eternal City—Rome. He left this place before the time of the Trojan war. On reaching the Hieron of Epidauros we put up at the home of Panagiotis Vostetsanos, keeper of the museum. It faces the hill of Titthion on which the goats of Aresthanas gave milk to the new born god of medicine. To the right, on looking toward Titthion, is the best preserved ancient theatre in the world. Here multitudes were instructed in hygiene and entertained in various ways while waiting to be cured. It is a most remarkable structure to be found in such a place. No city was ever nearer it than the seaport of Epidauros, six miles away. Where then did the people come from to make such a theatre needed, with its seating capacity of 30,000? Besides this there was a large gymnasium that would seat well nigh 1000. In the front of the temple was the altar and in the interior stood the costly statue of the god that was composed of gold and ivory. Near the temple was the Katagogion, or hospital, 480 feet on each of its four sides. Small rooms were provided for each patient along the sides. At the rear was a corridor ex-

tending along the rears of all the rooms. Within this corridor-square were four small squares of rooms centered by four courts. This economical arrangement of the space gave a capacity of over 160 patients with each room and bath to himself, and that without stair climbing or absence of air. There were other large buildings that were probably used as dormitories for the convalescing, or those with minor ailments. A building immediately adjoining the gymnasium is believed to have been the dwelling place of the priest-physicians. Bathing houses and bathing places were numerous and one large marble bath tub we saw was about the shape of our modern ones. On the temple grounds is a holy well 54 feet deep while numerous surface and subterranean water conduits direct the streams from the surrounding hills in the direction of the Hieron. There were hot baths, cold baths, Turkish baths, and friction baths. The patients had to use dumb-bells and undergo gymnastic exercises. The "incubation" cure occurred within the temple by the patient sleeping there in a condition of discomfort that led to dreaming. The dream was interpreted by the priest and was supposed to direct to the required treatment. The chief medicines administered were salts, honey, and an abundance of water from the holy well. Patients left inscribed slabs giving thanks to the god for their recovery. The Grove of Esculapius was filled with the rich votive offerings they left as recompence. At the Tholos sacrifices of animals occurred. The meat was consumed by priests and patients and the entrails burnt as a sacrifice to the god.

From the Hieron of Epidaurus we made our way back to Athens, stopping long enough, enroute, to see the wonders of Tiryns, Mycene, and Corinth. From Athens we proceeded to Smyrna, saw considerable of Turkey and returned to Smyrna again. From there we visited a number of places that we will consider in our next letter. One of these places was Vathy on the Island of Sa-

mos. The ancient city of Samos lay just over the mountain. Here Pythagoros was born. This father of medicine, unlike the Asclepiades, or Priests of Esculapius, visited patients at their homes and taught his disciples to do the same. He studied in Egypt and India, so got his lore directly from the oldest peoples. His system of philosophy profoundly impressed the world. It was based chiefly on the properties of numbers. He represented the spirit of all being by the figure 1, matter with its attendant motion by 2. The universe (1, i.e., God) be placed before matter (2) thus gives us 12. Since 12 is 3 multiplied by 4 he had 3 worlds—upper, middle, and lower, surrounded by 4 spheres. Since 13 is 1 before 3 it introduces the evil principle into the universe, with sin, disease and crime, and is therefore unlucky. The four spheres were represented by fire, air, earth, and water. As his doctrine was one of pure abstraction he meant the fire principle which we call energy, the air principle which we designate as gas, the earth principle which we designate as substance, and the water principle which we call liquidity. He held that no one could be in health unless his temperature, his breathing, his tissues and his circulating fluids bore a definite mathematical relationship to each other. They had to be Harmonic, i.e., have a perfectly balanced rhythm with the figure 12 and not with 13. As 3 plus 4 is 7, this last number was deemed a sacred one, and so we now have as a relic of Pythagoras' teachings 7 days in the week, 7 years of plenty, 7 stars, and a host of other 7's. To him we owe the universe-standards of 12 months to the year, 12 signs to the zodiac, 12 lines to the inch, 12 inches to the foot, etc. Our year he gave us as 365 days and a quarter. Every circle he made 12 times 30 degrees thus combining decimals with duodecimals. The year is 360 plus 5.25 days. The sum of 5, 2 and 5 is 12, thus again giving decimals and duodecimals. He believed sincerely in the doctrine that God geometrizes.

On our way from Samos we passed in sight

of Cos, but did not stop. Here Hippocrates was born, and here he acted as a priest-physician in the temple of Esculapius. From Epidaurus a number of branch institutions were started, chief among which were Pargamos and Cos. We got a peep at Pargamos on our way from Constantinople to Smyrna. We were now getting a peep at Cos on our way to Beirut. A narrow channel had to be passed here that permits of the seeing of Cos on one side and Halicarnassus on the other. The latter was the site of one of the seven wonders of the ancient world. Hippocrates was the contemporary of Socrates. He claimed descent from Esculapius. Like Plato and Pythagoras he was a voluminous writer. What is probably one of the first medical schools in the world was started at Cos by Hippocrates. The Hippocratic oath was first given here. With Pythagoras he held that health depended upon the exact proportions and play of elements in the body. He first taught the doctrine of crises or turning periods to disease. He classified treatment and diseases as medical and surgical. He made prognosis a leading feature of his practice and followed the methods already given in describing the Hieron at Epidaurus. The people of Cos show travellers a tree that is supposed to have been planted by Hippocrates, and point out the ancient aqueducts, from the fountain of Burima, on the side of Mount Prion, as being remnants of the Esculapian water-works for the temple.



## CHRISTIAN AND SARACEN.

IN my last letter Pergamos and Cos were referred to as places where the doctrines of Esculapius had taken deep root. In this communication it is necessary, for the proper understanding of our subject, to once more recall them and emphasize the fact that we have here not medical men to deal with, in the modern sense, but a religious body. At the time these two places were at their best Esculapianism was the religious cult of the people and the curing of the sick was then held to be evidence of the real divinity of Esculapius. The priests were believed to bring to the sufferers the relief they sought through the miraculous power given them by the god which they represented. The evolution of medicine, then, as a science, chiefly depended upon the mental development of the religious priesthood to a point where they were able to take the advantage of physical forces in bringing about their cures. As long as there was little or no religious rivalry there could be little or no stimulation to excel in curing power. At the beginning of our era such rivalry arose and our last communication left the reader at the point of early contact between the contending creeds. Upon each devolved the necessity of proving the influence they had upon nature as given to them by supernatural agencies. We have already seen how, under Hippocrates, the Asclepiades were verging toward a scientific system. Five hundred years after his appearance a new stimulus arose and met his disciples face to face in both Cos and Pergamos.

We learn from the Acts of the Apostles that St. Paul preached in Cos and in Samos.

He had likewise churches established in Ephesus and Smyrna. The last named place is less than fifty miles from Pergamos. About an hour after our ship left Samos, on our way to Cos, we came in sight of an island the name of which must be quite familiar to all readers of the MEDICAL FORT-NIGHTLY. That island is Patmos, where St. John wrote the book of Revelations. He was a prisoner there when he wrote it and his opposition to the Greek and Roman gods, of which Esculapius was one, caused his incarceration on this, then, penal island. It lies nearly midway between Pergamos and Cos, a few miles from Samos, and somewhere near thirty-five miles from Ephesus. In the first chapter of the book of Revelations St. John mentions the names of the seven churches of Asia giving Pergamos, Smyrna and Ephesus as three of them. In the second chapter he tells the church at Pergamos that they dwell "at Satan's seat." Concerning the Esculapian habit of sacrificing fowl and cattle to the god of healing and eating the edible part of such sacrificed animals he says: "I have a few things against thee, because thou hast there them that hold the doctrine of Balaam, who taught Balac to cast a stumbling-block before the children of Israel, to eat things sacrificed unto idols." He held that the ways of the people of Pergamos, in this particular, were the same as those that had been condemned at the time of Balaam and that they should be opposed. We see by this attitude that there was no attempt at compromise between the Christians and the pagans in matters of faith. For the reviling of the gods the Christians were compelled to suffer, as did Socrates long before their appearance. Pergamos was then the chief center of Esculapean education—the seat of their university,—and hence was called by St. John "Satan's seat." It was here that Claudius Galen acquired the first part of his medical and surgical education, and here that he was born. Beginning his surgical work in the great circus of his native city he

soon discovered that his knowledge of anatomy was insufficient for him to do such work properly and so we soon find him leaving Pergamos and going to Alexandria, in Egypt, to learn more. Priests of all kinds—Roman, Grecian, Christian and Moham-medan—have all condemned dissecting. In Alexandria had arisen a school opposed to all religions, and it not only tolerated, but encouraged dissecting. It was this Egyptian freedom that led the parents of Jesus to take him there and so protect him from Herod. Galen's studies in Egypt made him master of the situation, and the greatest physician and surgeon of his age, as well as converting him into the leading medical authority of many succeeding centuries. It is quite likely that Pergamos and Alexandria had been closely linked, as medical centers, from the time that Marc Antony gave the Pergamos library, of two hundred thousand volumes, to Cleopatra to be transferred to the Egyptian capital. This act of Antony's may have been an indirect influence that made such a man as Galen possible at that early period.

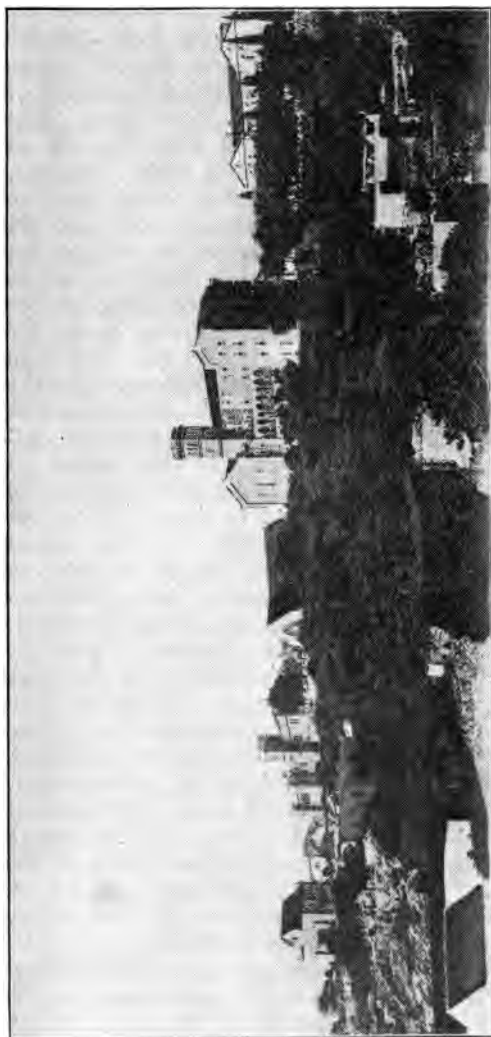
What Galen has been to scientific medicine St. Paul has been to the spread of Christianity, but St. Paul preceded Galen by about a century. The principal medical authority among the followers of Esculapius, at the time of Paul, was Celsus, of Rome. It took about a hundred years of religious conflict for the struggle between Christianity and Greek mythology to produce the scepticism toward the latter, that evolved Galen. Without that conflict there would have been no serious decline in a belief in the gods. Without it there would have been no toleration of dissecting and particularly the dissecting of human bodies. Without it Galen would never have been permitted to vivisect animals and acquire his knowledge of physiology. In extinguishing the fires upon the shrines of Apollo and the other Olympian deities, the preaching of Paul forced progress upon a too conservative world. Let us then follow for a while the career of St. Paul.

After our ship passed Cos it made directly for Beirut, passing on the way the important islands of Rhodes and Cyprus. On reaching Beirut we were permitted to go ashore, in defiance of all precedent, at an hour long after medical inspections of incoming vessels usually occur. To our surprise, the table mates with whom myself and wife had become acquainted during the voyage, were no less personages than the new governor of Palestine, his first wife and children. Their freedom to land at that late hour gave the same freedom to all first class passengers. With them was also the son of the Turkish governor of Syria. No one on board had suspected that the pleasant little woman to whom we had been permitted to speak was the "forbidden one" of the highest representative of the Sultan in the Holy Land. She had removed all signs of being a Turk, cast aside the restrictions of the harem, and appeared in Christian costume, without even an excuse for a veil. Before going ashore, however, she was so closely veiled that no one could have told her to be the same person. Next morning, after landing at Beirut, we had the pleasure of going the rounds of the American College, its hospital wards, its lecture rooms in both pharmacy and medicine, and seeing something of its dispensary service. Here is a bit of American civilization, with American teachers and American preachers, planted at the base of the Mountains of Lebanon. We were guests at the home of one of the professors, so had a competent guide and friend to show us around. But we could not stay long here as we had to hurry on to Baalbeck and Damascus.

The railway ride through the mountains of Lebanon is a delightful one. The ascent of the mountains, from Beirut, is particularly fine. At Baalbeck we saw the great temple of the sun and the huge monoliths which its walls contain. They are probably the largest hewn stones in any building in the world. One extremely large one still lies, unfinished, in the quarry at the other

end of the city from the temple. The Arab natives at Baalbeck, and in the region between that and Damascus, reminded us, at every turn, of Mochi, Navajo, and Pueblo Indians. The resemblance in their houses got more and more pronounced as we proceeded so that just before reaching Yabfoufah it became startlingly so. Had we been brought there blindfolded it would have been difficult for us to persuade ourselves that we were not on a Santa Fe train somewhere between Albuquerque and Williams. The flat-topped houses, cliff-edged houses, step-formed houses, absence of chimneys, ladders by which to get into the houses by way of the roofs, adobes, mud ovens, brilliant costumes, and the color of the people all evoked the suggestion.

As we neared Damascus we were made aware of our being now in the ancient home of Abraham, the original source of the peach, the almond, and the damson plum. The river we were so frequently crossing was the Abana of the Bible. At last we reached what is probably the oldest, still living, city on our planet. As we threaded its narrow streets we felt as if we were at last in the land of the Arabian Night's entertainments and might at any minute meet Ali Baba on his way home from a robber's cave. Before Bagdad became the seat of the caliph this city had that honor, so that here grew the original spirit of Bagdad the real home of Ali Baba. Here Mohammedanism flourished when at its period of quickest growth. Here Mohammed's daughter and two of his wives died and are buried. Here St. Paul was converted to Christianity, became the "apostle of the Gentiles," and after escaping from here carried the gospel to all the chief countries that worshiped Apollo and Esculapius. Here the medical aphorisms of the Mohammedan physician Serapion—otherwise known as John of Damascus—were written. Here, in our own age, Buckle, the first of evolutionary historians, died and was buried. Within a few steps of his grave, and near to where tradition says Paul was



AMERICAN MEDICAL COLLEGE AT BEIRUT, SYRIA.

converted, is the place where, in 1860, the Mohammedans massacred over 50,000 Christians, in cold blood. Within the walls of the city is the celebrated "street called Straight," and around it are the bazaars that are the delight of every tourist when he first visits the place. The covered streets permit of marketing in all kinds of weather. The divisions of these streets into regions of special business, permits of easy shopping. Blocks of space are devoted exclusively to saddlers. Still other blocks only contain shoemakers. Then there is the region for the carpenter, the region for the green grocer, the region for the coppersmith, the region for the bookseller, the region for the silk dealer, the region for the dealer in silverware, the region for cotton goods, the region for hardware, etc., etc. No where else on earth is this dividing off of business carried to such perfection. In the region of second-handed goods is a subregion for old clothes that is known to everybody as the "Louse Bazaar." The city contains about 200,000 people, and yet there is no delivery of mail. The same divisions that characterize businesses are found in nationalities. Jews, Syrians, Arabs, Franks, Germans, English, Turks, Egyptians, and Italians have each a special region of the city in which to live. A letter addressed to John Brown, Damascus, will be sent to the British postoffice by the letter sorter. There Mr. Brown will call and get it, or the porter of his hotel will get it for him. Nothing more is needed on a letter than the name of the man, or woman, and of the city. If it is an Arab name it is sent to the Arab postoffice, if French to the French postoffice, and so on to all the other offices. If a doctor is wanted one can be found quickly in any part of the European section, while in the Asiatic they are scarce.

If we visit the tombs of great persons, or the mosques, we will soon discover that the masses of the people pin their faiths more to prayers and magic than science, when they are ailing and want to be cured. In all

of these will be found offerings from the sick, from a torn piece of garment to a model limb. Each has been placed there along with a prayer or a superstitious invocation of a magical character. Although there are a number of great names, among ancient Saracenic medical men, none of them were orthodox Mohammedans and all of them were but echoes of Galen or Hippocrates. This is why Damascus has given to the world little of direct value to medicine. Its indirect effects will appear as our story develops. Like Paul, after his conversion, we did not tarry long in Damascus, but proceeded at once to Jerusalem. On our return to Beirut, in order to take ship for Jaffa, we met many tourists whose fate forbade their visiting the Holy Land. The coast at Jaffa being strewn with huge jagged rocks will permit of no landings when there is even a moderate gale blowing. There is no landing place for ships and row boats are frequently knocked into splinters upon the rocks. These tourists had been in sight of Jaffa, desiring to land, yet their ships had to carry them away with nothing better than a distant view of the coast. Some of them had come all the way from the United States, with Jerusalem as their chief objective point, but they were not permitted to get there. We were much more fortunate. Our ship passed in full view of Tyre, Sidon, Acre and Haifa, hugging the coast all the way because the fineness of the weather permitted it.

This is the region of frequent storms, and it was here that Jonah won his bad reputation, and was made food for a whale, because of the tempests that he brought on the ship he was travelling in. It was at Tyre that "Barbarossa" died and was buried in 1190 A. D. For him the ship in which we crossed the Atlantic was named. Christ and St. Paul both preached in Tyre, Hiram, king of Tyre, supplied Solomon with the cedars from Lebanon used in the building of the temple.

As we passed in sight of Acre we were re-



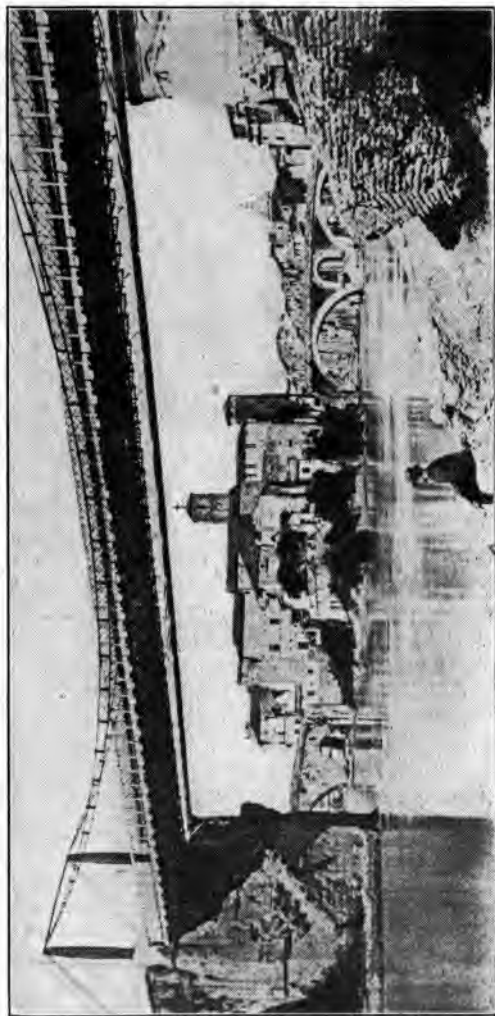
mind of the fact that this was the headquarters of the crusaders during the time of Richard, the lion-hearted, of England, and the refuge of the Knights of St John when the Saracens took Jerusalem. We spent several hours at Haifa where we went ashore and walked the streets to which the boy Jesus must frequently have come from the nearby town of Galilee.

Mount Carmel, at whose foot Haifa lies, is the place where Elijah performed the miracle of drawing down fire from heaven and where he slew the priests of Baal. It was in the neighboring village of Galilee where the last supper was eaten and in which Christ brake bread and gave it to his disciples.

In going to and from our ship at Haifa, Beirut, and Jaffa, we learned that the Arab refrain sung by the boatmen meant expressions like: "Allah is good and will strengthen our arms;" "The Eternal One is kind and will help us pull;" "Thou giver of all blessings carry us safely;" "Thou calmer of the waves let no storm overtake us;" "Oh Allah, thou art our strength and the rock of our defense."

As we went ashore at Jaffa we remembered that it was from here that St. Peter sailed when going on his mission to Rome, and it was here that Napoleon Bonaparte was charged with poisoning plague victims, so that they should not be able to spread infection among his soldiers. The distance from Jaffa to Jerusalem is 54 miles. We reached the latter place at 5 p.m. and put up at the New Grand Hotel, on Mount Zion. As it was the 24th of December we immediately made arrangements for a carriage to take us and our guide to the Church of the Nativity, at Bethlehem. This church is built immediately over what is believed to be the manger in which Christ was born. We left Jerusalem at 9 p. m. for this trip of twelve miles. As we left Mount Zion, passing out of the city, we observed to the east the planet Jupiter, shining with unusual brilliancy, because of the clear, dry atmosphere of that country. As we got nearer to Beth-

lehem it kept rising in the sky and when we reached the church it was immediately over our heads. The coincidence was most striking. Here it was the anniversary of the very night that the Magi followed a star to this same spot. This star—Jupiter—was named after the Roman god of gods. We stopped at the well of the Magi on our way and reached Bethlehem at the same hour they are supposed to have got there. The Church of the Nativity is divided into two parts, one being used by the Greek church, and the other by the Roman Catholic. Both were more than crowded by a surging mass of worshippers. Bishops and priests swung censers, went over extensive ceremonials and at, or after midnight betook themselves to the crypt below the church, where the manger—now converted into an altar—is situated. Lining the entire way, from church entrance to manger were two dense lines of Turkish soldiers with rifles, fixed bayonets, and heavily loaded cartridge belts. Between these the processions of priests were compelled to go bearing the image of the infant Christ, the crucifixes, the emblems of the sacrament, etc. The entire floor of the crypt was covered by kneeling figures busy telling beads and praying. Most of them were women and many of them nuns. A narrow space was kept clear for the procession to pass. The Greeks got through their services first so had the first right of way to the manger. The Roman Catholics followed and had the pleasure of seeing the soldiers prodding the dallying Greek priests so as to hurry them out of the way of the second procession. Before these soldiers were placed here, on Christmas eves the conflicting Christians frequently met in deadly conflict contesting each other's right to first descent. Now the Mohammedan soldiers keep the peace. All the worshippers, on passing the manger, bow, cross themselves, use the holy water there provided, and utter prayers as they proceed. With such a crowd present the air was, as might be expected, stifling. At the close of the ceremonies we returned to Jerusalem,



ROME: ISLAND *of* TEMPLE OF ESCULAPIUS.

and just as we passed into our hotel the city chimes rang out 3 o'clock in the morning.

Seeing Jerusalem is taking a most thoroughly comprehensive lesson in Bible history. Every street, every corner, every hill, every spring, every church, every valley, every gate, every mosque, every hospital, and almost every object one meets is replete with historical connections. Myth and fact are so closely intertwined that it would not be possible for any person to fully separate them. There are places the tales told of which are evident fables while there are others the facts of which are fully attested and of undoubted verity. Every tourist is sure to visit the Mount of Olives, look off in the south and west where lie the Jordan River and the Dead Sea, enter the Garden of Gethsemane, pass through the Valley of Jehosaphat, make a careful inspection of the Mosque of Omar and the Mosque El Aksa, see the many stations where Christ is supposed to have performed certain acts while bearing his cross, and inspect what is left of Solomon's stables and the places from which Christ is said to have driven the money changers. In our hunt for places connected with the evolution of medicine we did not forget to visit the Muristan, or Hospital of the Knights of St. John of Jerusalem, and the tombs of the prophets, where is supposed to lie the remains of Ezekiel who wrote the memorable words: "This is Jerusalem; I have set it in the midst of the nations."

While looking through El Aksa we did not forget that from this spot came the sentimental veneration we have, as American doctors, acquired for the Red Cross. It is a spot likewise venerated by Free Masons, for here stood that part of the Temple of Solomon where the Knights Templars took their rise. While the historical continuity between the ancient Knights Templars and the modern ones is entirely broken, the sentimental connection is binding, even if the former did misbehave. From them came the red cross—the symbol of blood and destruction—while the Knights of St. John

gave us the white cross as a symbol of healing and of Christian charity. These two classes of knights fought the Saracens together, but it was the latter and not the former who gave us hospitals and dispensaries, surgery and nursing. The former were soldiers only, but the latter added to the function of the soldier that of nurse, surgeon, physician and friend. What is left of the Muristan stands near the Church of the Holy Sepulcher. Charlemagne founded a monastery on this spot, but in 1048 it was sold to some merchants of Amalfi who converted it into a hospital. So much good did it accomplish that rich Christians from many countries helped it financially, and out of it grew the order of Knights to which reference has been made. It was not long before the flower of European youths, including even princes of royal blood, took upon themselves the vows of this order and rallied to the defence of Christ against the Saracen and to the caring for the sick and wounded. They established hospitals at most of the large seaports of Christendom so as to care for pilgrims on their way to the Holy City. During the period of the crusades no other organization rendered such valiant service either in the field of battle or on the march. Godfrey of Bologne became a patron of the order, although himself a Knight Templar. During his reign, as king of Jerusalem, their strength was materially increased. At the taking of Jerusalem, during the first crusade, both classes of knights stood side by side in the siege. It was then that St. George is supposed to have appeared, on the Mount of Olives, and beckoned them on to victory. After that St. George became fixed as the patron saint of the crusaders and the red cross the symbol. In the second crusade Richard, the lion hearted, paved the way for the choosing of that same symbol as the flag of England and the taking of St. George is the patron saint of England. In this way that particular color of cross became familiar on the battle field, and when Dunant Henry

established his organized nursing corps its popularity led to its adoption as their signal. In spite of its utter inappropriateness for such uses as it is now being put to, it has probably come to stay, and no amount of protest will be likely to get rid of it. Its original meaning has become almost completely reversed, just as the original wearers of it, who had sworn fealty to the Christian cause, came in time to execrate and spit upon it as part of their initiation ceremonies. The tragic ending of the order seems to have made the sign they wore the more revered, and has placed it above the much more appropriate white cross, of the Knights of St. John. The latter body, after an existence of nearly 1,000 years, is today in charge of the British Ophthalmic Hospital of Jerusalem with Dr. W. E. Cant as its chief surgeon.

During the millenium of their existence they have had a most eventful career. To their efforts we owe so much—indirectly—for the advancement of medical science that it will probably be long before the debt will be fully acknowledged. Had they done as much in a direct manner, so that children could have been able to see the connection, the acknowledgment would have been made long ago. Tossed, as they were, by Saracenic power to Margat, to Acre, to Cyprus, to Rhodes, to Crete, and finally to Malta, with deeds of bravery marking them at every turn, they acted as the brake upon the wheels of Mohammedanism that held that power back from its self-imposed task of trying to force Islam on Europe. Their defeat at Rhodes is the defeat in all history of which it has been said, "Nothing in the world has been so valiantly lost as Rhodes." Their long possession of Malta, and the fact that it was on this same island that St. Paul was wrecked, induced me to turn aside from the direct route marked for myself, in order to see this queer little gem of the Mediterranean.

Malta is, at present, the Gibraltar of the center of the Mediterranean. It is Eng-

land's stronghold on its way to Egypt and India. The capital of the island is Valette, a city built by the knights on the spot where they had one of the most severe of all their battles with the Mohammedans. Then 2,000 knights successfully beat back 40,000 Saracens killing 25,000 of them. At the close of the battle only 600 knights were left who were capable of bearing arms. The day before the enemy retired they all expected to be killed. In honor of La Valette, their Grand Master, they named the new city. The site is a most picturesque one and it overlooks one of the finest harbors in the Mediterranean. Being built in the 16th century its streets are narrow and occupying, as it does, the side of a hill they are rather steep. Many of the buildings, and particularly the cathedral, are very fine, but the Military Hospital is spoken of as "the glory of Malta." The club houses, or Aubreges were magnificent, but are now converted into public buildings. At the time of knight rule every patient in the hospital had two beds, a wardrobe of his own, and only two patients were put into a single ward. They were waited upon by "serving brothers," their food served on solid silver dishes, the most costly wines supplied, except when forbidden by the medical attendant, their appetites coaxed with expensive viands, and their every wish anticipated. These luxuries have now departed, but the large, airy rooms still make excellent resting places for "Tommy Atkins" when sickness overtakes him. The former residence of the Grand Master is now the Governor's Palace, and in its museum can be seen the mailed coats of armor, the bows, the arrows, the swords, and the flint guns of those old times. The walls of the rooms are hung with the rich and costly tapestries that have not been removed. On floors and walls are many marble mosaics that attest the splendor in which these Knights lived. Perhaps the most surprising feature of Valette is the fine stores and rich supplies of merchandise seen in its chief business

street. To leave any of the surrounding Italian, Greek, or African cities and to visit this is to feel as if one had left the middle ages and dropped into New York or London. The people, of course, look different and their habits are different, but the lavish display of fine goods and plate glass windows is a reminder of Broadway. The women are certainly quite different from London or New York women, inasmuch as they all dress in the garb of nuns. From the beggar woman of the street appealing for alms, to the finest lady in embroidered silk, they are all enveloped in large black veils, hooded over the tops of their heads and extending down to their always black skirts. These nunly costumes are a relic of knightly times when "mother superiors" and "sisters" set the styles for Valette. In the neighboring city of Citta Vecchia, that is almost in the center of Malta, the ladies do not adhere so strictly to this style of dress. A trip there is a unique experience as the intervening country is quite unlike anything one can see elsewhere. It is all divided up into small plots, and as every plot is surrounded by a cobble-stone fence the impression received is that of a huge, but now abandoned, quarry.

As one looks off toward the sea, from the highest point in Citta Vecchia, the scene is very impressive, and in looking northward, in the direction of St. Paul's Bay and Gozo Island, the guide reminds us of Ulysses having been detained by wily Calipso in the latter, while shipwrecked Paul was cast ashore in the former. The guide is always sure to take the visitor into the catacombs, where the early Christians hid from their Roman persecutors, and then to the excavations where exceedingly handsome mosaic floors have been unearthed, that attest the splendor of the Carthaginian homes that were here long before the time of Paul. But Rome subdued Carthage and Paul was on his way with a message destined to subdue Rome. Had that message been confined exclusively to matters of the soul it would not



have been considered in this narrative. Most people are apt to forget that early Christianity started as a gospel of medicine as well as a gospel of religion. Owing to its medical aspect our interest must, for a while, center upon St. Paul. Jesus, the New Testament tells us, came "healing every sickness and every disease among the people." He commanded his disciples to heal the sick. In quoting the old proverb of "physician heal thyself" he applied it to himself, and thus impliedly assumed this title. He referred to the brazen serpent of Moses as typical of himself, and thus assumed as his own the same symbol that had long represented the cult of Esculapius. Luke, prior to adopting the Christian faith, was a physician, and hence either a disciple of Pythagoras or of Hippocrates. Paul and Peter, the two chief messengers of Christ to Rome, were both healers of the sick. All of the Christian apostles were priest-physicians. As the gospel according to Apollo and Esculapius had long preceded these men to Rome it is apparent that a struggle for existence was sure to arise, and that the result would be either the total suppression of one or the other, or some sort of compromise would occur. Facts indicate that the latter happened. It is not at all probable that either Peter or Paul were able to foresee the far-reaching consequences of their visits to Rome. No more did Paul foresee that his preaching was to cause the merchants of Amalfi to establish in Jerusalem a hospital that would finally make all Europe—indeed we might say all the world—debtors to him, nor that the forces that did this should center upon the very island upon which he was wrecked. In following him to Rome let us turn aside, on the way, and look at Amalfi and the region immediately around it. The circuit generally pursued by tourists, in going to see Amalfi, constitutes what is probably the finest short tour upon the earth. It is one continuous panorama of loveliness and wonder, from the time of leaving Naples till the return to Naples again. Who has

not seen this has not seen the ne plus ultra of astonishing sights and of grandeur. The Blue Grotto, at Capri, is alone worth a trip to Italy to see. The pearly blue lustre of the salt-water within the cave, its fairy-like splendor and suggestiveness of liquid fire when it is struck by the oars or splashed by a bather, is a wonderful sight. Then there is the magnificent view from the Villa Tiberius, with the accompanying thought that this was the home of the Caesar who ruled Palestine when Pontius Pilate, his representative, gave up Jesus to the rabble for crucifixion. But who can describe the carriage drive from Sorrento, through Amalfi, to Salerno, or who adequately describe Pompeii, Herculaneum, and Vesuvius? Every step of the way is not only indescribably grand, but is all a mass of petrified history. How could Columbus have found his way to America, or Vasco de Gama to India, had not Amalfi given us the mariner's compass, as it likewise gave us the Knights of St. John? What would modern medicine have been had the University of Salerno not rekindled the fire—almost an extinguished fire of medical education? Where would our latest researches in biology have come from had the aquarium at Naples not initiated the new dispensation of experimental biology? Yet the inspiring influences that, step by step, led up to these is clearly traceable to Rome. "All roads," we have been told, "lead to Rome," and it is quite certain that all suggestions and all cures of the middle ages that paved the way to modern methods of thought, once had their home in Rome.

We have already referred to the pestilence which occurred in Rome, in B. C. 291, during which ambassadors were sent to Delphi where the oracle told them to go to Epidaurus for succor. It was then they carried one of the serpents, that were common in the grove of Esculapius, to Rome as the representative of the god of healing. When the ship arrived in Italy the serpent was carried to an island of the Tiber, in Rome,

where a temple of Esculapius was built in commemoration of the event. Ovid tells us that after the "salutary serpent" reached Rome the plague subsided and,

"Now no more the drooping city mourns;  
Joy is again restored and health returns."

At the time St. Paul reached Rome the Esculapean temple of health stood upon the Insula Aesculapii where the Church of St. Bartholomew now stands. This island was constructed in the form of a ship, a tall obelisk in the centre represented the mast, the hospital wards on the sides were the cabins, and in the bow there was placed a duplicate image of that of Esculapius at Epidaurus. Parts of the travertine bulwarks are still shown within the monastery garden of St. Bartholomew and numerous votive offerings, in the form of terra cotta limbs that have been dug up there, are on exhibition. As has already been stated the chief representative of the cult of Esculapius at Rome, on the arrival of Paul, was Celsus. Nero's physician, at the time Paul was beheaded, must have been Andromachus.

He was, perhaps, the first of the so-called Archiaters, or royal healers. Following him came Popular Archiaters or public health officers. They were paid certain sums by the city besides having special regions reserved for them to practice in and where no other healer was permitted to take cases. Visitors to Rome always go first to see the splendid monument of St. Peter's—the glory of the Roman Catholic Church. Not so many go to see Santa Paulus, on the Way of Ostia, that is supposed to mark the site of St. Paul's grave. In some respects it is more interesting than St. Peter's. When, under Nero, these two messengers of Christianity were martyred who could have foreseen that the principles they had planted in that city were destined to control it and its empire and that such splendid monument's would be erected to their memories?

But the parts of their teaching that have survived are not the medical. It was less than a century after their deaths that Galen

came and laid the seed that long after developed along the lines of true progress. It was necessary, however, that much of the superstition of the Esculapians should be destroyed and its destruction came about through the friction in thought between it and Christianity. Mohammedanism came in at a little later date giving a triple conflict. Wars and pestilences followed and these tested the value of the respective claims and kept testing them long after the name of Apollo was forgotten. As the sequel will show a large amount of Greek superstition still survives in the public mind, owing to its having been adopted by monks, knights, and priests, all over Christendom. Even to this day, in Ireland, in Spain, in Italy, in Russia, in Greece, in Austria, in Turkey, and in Syria, one can find votive offerings hung around tombs, churches, holy wells, shrines, and abbeys, while the practice of incubation is still perpetuated in many Christian countries. Sir T. Clifford Allbutt has recently said, "The history of medicine, broadly speaking, is melancholy reading; it is a record of devastation by pestilence, deplorable blights upon family life, and catalogues of medical formulas and practices as prodigious as the plagues before which priest and physician alike vaunted themselves in vain." Bad as it is it would have been much worse but for the conflict of opinion which arose through the struggles of rival religions in whetting thought and encouraging the proving of all things and holding fast that which, on trial, turned out to be of value:

"For all of good the past hath had remains to make our own  
time glad,  
Our present daily life sublime, and every land a Palestine."

## MEDIEVAL AND RENAISSANT.

To Italy, more than to any other single country in the world, we are indebted for the earliest intellectual impulses that led in the direction of modern medical science. To the same country, however, we must credit the retarding influences which, for centuries, almost extinguished the spark from Aristotle that constituted the vital principle which finally led to science. During mediæval times every idea of right had crystallized into inalterable formulas that it was deemed sacrilege to alter or disturb. The school at Salerno had accumulated a considerable amount of the semi-digested truths of the old Greek followers of Esculapius and the male and female professors of that institution were teaching them, to men and women students, in a most perfunctory manner. It is not quite certain just where the inspiration came from that made the Salerno school possible, but the facts seem to point to the monks of St. Bernard, of Monte Cassino, as the source of its parentage. These monks had in turn gained their light from the Greek traditions that hung around the temple of Apollo which they had appropriated as their home. Before the beginning of the ninth century the fame of Salerno, as a proper place in which to acquire medical knowledge, had extended to the ends of the civilized earth. The students were of many nationalities so that from here went forth most of the trained medical men of the world. But the blight of conservatism was upon this institution as upon almost everything else of that period, and as a result not one name, within the long list of its professors, has come down to our day as

ever having done or said anything that would tend to immortalize his or her memory. When the new era of research came in Salerno clung fast to its traditions, entered into senility and, as a consequence, perished. The city still occupies the same beautiful site, on the Bay of Salerno, but its streets echo no more the noise of its polyglot students and the college buildings have left no trace of their ancient glory. But although as a corporate body it has disappeared from the earth it has left behind it some very healthy progeny. These the medical visitor to Italy can ill afford to miss seeing. The three most important, from the view-point of evolution, are the Universities of Bologna, Padua and Pisa. Not to see these is, for the medical tourists not to see Italy. My sight-seeing in this land of sunshine and historic romance, included the museums, palaces, and picture galleries of Rome, Florence and Sienna, the catacombs, churches, historic fountains, and ancient ruins of Rome, the cathedral monuments and palaces of Milan, the homes of the Doges, historic churches, and canals of Venice, the leaning tower and baptistry of Pisa, the monuments, palaces, and grand natural panorama of Genoa, and the vast multitude of beautiful and interesting sights in and around Naples, but none of them gave me the satisfaction that came from an inspection of the ancient Universities. Until I had seen the places where the germ of modern enlightenment began its unfoldment, where human eyes first saw the early dawn of liberty and truth, and where the struggling forces of radical and conservative thought found fitness in a genuine appreciation of that knowledge which has its foundation in the solid ground of nature, I was certain that I had not seen the best that Italy affords.

A study of the universities of Salerno, Bologna, Padua and Pisa, combined with a due appreciation of the weakness as well as the strength of Papal Rome, can supply the mind with a knowledge of how we came by a circumnavigated earth and much of the

glory of this twentieth century of civilization. A single glance at a few of the names in the glittering galaxy of stars that shone out among the professors and students of these places of learning will quickly tell the tale of what they did for modern medical science. Bologna, the parent institution of Padua and Pisa, gave us Vesalius, the creator of modern anatomy, as one of its teachers. But as he taught in all three of these institutions every medical tourist should see them all for his sake alone. And what a battle he fought for us. Bat-eyed followers of inherited ideas refused to see the light that he produced. Look at Sylvius, even after Vesalius, had long been laid to rest, taking up the cudgels for Galen. Vesalius' demonstration that Galen's anatomy was defective inasmuch as he claimed for man an intermaxillary bone, as is found among the lower animals, Sylvius would not accept. When confronted with the actual skeleton of man he dared to reply: "Man had this bone when Galen lived. It is luxury, it is sensuality that has gradually deprived man of this bone." Another of the great men who taught at Bologna was Malpighius, the one who first described the development of an embryo, who first saw and showed to the world a blood corpuscle, who completed the work of Harvey by showing the capillary circulation, who discovered the cutaneous glands; who showed wherein the difference lay between negroes and whites by discovering the pigmentary layer of the skin, and who discovered the malpighian tubes and capsules of the kidneys. Mondino, the great anatomist, was also a teacher at Bologna and de Chau-liae, the restorer of French surgery was his pupil there. Petrarch and Boccaccio, the fathers of the Renaissance, that brought redemption from darkness to Europe, were taught at Bologna and launched their much needed reformation from that seat of learning. Realdus Columbus, who almost completely anticipated Harvey by discovering the pulmonary circulation, was a pupil of Vesalius and lived and taught both at Padua

and Pisa. Fabricius, the discoverer of the valves of the veins and the first to cast discredit on the old notions of embryology, taught at Padua. Harvey, the immortal discoverer of the complete circuit of the blood and the first to declare that all life comes from pre-existing life, was a pupil of Fabricius. In France, England, Germany, and elsewhere he was jeered at and mocked by the leading professors of physiology and anatomy, for daring to publish his "*Exercitatio du Motu Cardis et Sanguinis*" (Concerning the Motion of the Heart and Blood in Living Creatures). Riolan, the leading anatomist of Paris, jeeringly declared that what was true in this book was not new and what was new was not true. Fallopius, the discoverer of the fallopian tubes, taught at Padua and Pisa. Wirsung, the discoverer of the excretory duct of the pancreas, studied at Padua. Galileo, the world-renowned astronomer, taught at both Padua and Pisa. At the latter university he invented the pulsilogen—the earliest precursor of the sphygmograph—in order to test the oscillatory time of the chendalier in the baptistry at Pisa. There were no watches or clocks in those days, and so his own pulse was thus brought into use in order to discover a great law of nature. Caesalpinus, the greatest of the physician-botanists of the period of the Renaissance, taught at Pisa. Linneus called him the first systematic botanist of the world. His country claims for him the honor which the rest of the world gives to Harvey. Independently he made the same discovery of pulmonary circulation as did Realdus Columbus, but he did not trace the entire circuit of the blood as Harvey did. He was, however, the first to use the expression, "Circulation of the blood." Many other names of equal greatness came into prominence from these institutions in other departments of science than that of medicine. The famous universities of France, Great Britain, and Germany took these as their models, so that they are really children of the Italian schools.



What was the cause of such greatness? How came they to break the crust of medieval conservatism? Wherein lay the secret of their strength and of their rapid growth? How came Bologna to have as many as ten thousand students upon her rolls in a single year? Why were most of these students from foreign countries and chiefly from Germany? To get a proper answer to these questions is to discover the secret mainspring of medical evolution in the middle ages.

As my readers have already been informed, the good ship *Barbarossa*, of the North German Lloyd Company, carried myself and wife across the Atlantic on our grand tour around the world. The name "*Barbarossa*" hung like a vision of the past in some remote corner of my cerebrum.

"Who was this *Barbarossa*," I was asked, "for whom this ship is named?" All I could then reply was that the German king, Frederick I, who took an active part in the Crusades, bore this title. No one on board, among the passengers, seemed to know any more about him than I did. Not content with this meagre recollection, and having my curiosity aroused, I began the search for better information. Very soon I discovered that he was the central figure of Europe's greatness, for reasons that I am about to give. He stood in the center of a charmed circle of human ideality that has made the earth much different from what it would have been without him and without the idea he represented. To understand him and this idea to which reference is made we must go back, in imagination, to the year 800 A. D. when Pope Leo III crowned Charlemagne of France, king of kings and spiritual perpetuator of the Roman Empire. By the theory of the Catholic Church Charlemagne became the ruler of all the earth. To him every king became a subject and every kingdom a vassalage. He had, at this time, conquered a goodly part of the earth, but in no spiritual sense was he believed to have the divine right to rule until it came to him, from God, through coronation by the Pope. Never, at



A WING OF THE MEDICAL SCHOOL AT PISA.

FOR LIBRARY

any time, did either he or his successors become the accepted rulers of the kings of all the earth. After his coronation he became, thence forth, so far as the Catholic world is concerned, the Emperor of all true Catholics, and of what is known as "The Holy Roman Empire." The various orders of knights arose, at a later date, as the warrior priesthood of this theoretical empire. They became to it what the Catholic clergy are to the church and its Pope, real soldiers of the cross, chosen defenders of Christ, and promoters of Christian chivalry. Along the line of approved succession, to the title of Caesar (Kaiser) in this Holy Roman Empire, came Frederick Barbarossa the king (Koenig) of the Germans. Because of the color of his beard his Italian subjects called him Barbarossa, which literally means red-beard. He was crowned emperor, at Rome, by Pope Adrian IV, in 1155. His own ideas of the dignity of this honor are set forth in a letter which he wrote to his German prelates, in which he says: "On earth God has placed no more than two powers, and as there is in heaven but one God, so is there here but one Pope and one Emperor. Divine providence has specially appointed the Roman Empire to prevent the continuance of schism in the church." It was in his capacity of emperor that he led the knights, to the attack upon the Saracens, during the great Crusade in which he met his death. Of this event Brice, in his History of the Holy Roman Empire, says: "Germany was proud of a hero who maintained her dignity so well abroad, and he crowned a glorious life with a happy death, leading the van of Christian chivalry against the Mussulman. Frederick, the greatest of the crusaders, is the noblest type of medieval character in many of its shadows, in all of its lights." As leader of the knights, and as head of the crusaders, he becomes the pivotal figure in surgical and medical experience that the crusades naturally brought. As spiritual chief of the Knights of St. John of Jerusalem, he was the director of their hospitals and head of

their nurses and physicians. Not to dwell on this phase of his connection with medical evolution we must now consider the part which he took in the advancement of medical education. Of course it is impossible to separate what he did for medical education from what he did for education in general.

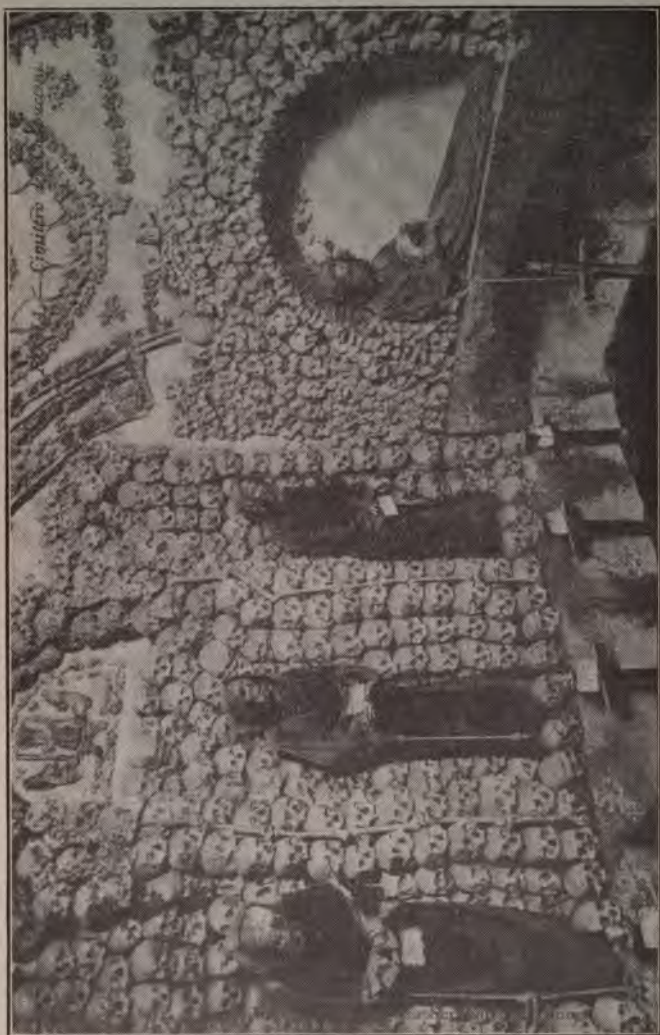
When on his way to the Holy Land Barbarossa found a condition of almost perfect anarchy at Bologna. Citizens and students were at war with one another. "I was a stranger and ye took me in" was the literal state of affairs of all students in that unhappy city. They were being robbed right and left and abused besides. Italy, at that time, and for generations before as well as after, was wracked and torn by party strife. City was at war with city and citizen with citizen. Questions of policy in government, between the popes and the emperors, were constantly bringing friction. A political party known as the Ghibelines stood by the policies of the emperors, while another known as the Guelphs hung with equal tenacity to the side of the popes. Padua and Pisa were usually Ghibeline, but Bologna was generally pretty evenly divided. A majority of the students were Ghibeline, while most of the permanent citizens were Guelph. Hence the antipathy between them. When Barbarossa passed that way trouble between citizens and students was at red heat. He at once had a code of regulations drawn up fixing the rates of charges upon students for necessary things, uniting all the teaching bodies into one corporation, and giving to students the right to appoint officers to try cases against themselves. Thus began the university. From this, with modifications, have come the pattern for all other universities that have come into existence. Prague, the earliest German university, copied from this. Disconnected schools there had been long before, but not universities. It was after the new incorporated form that Bologna grew to its unwieldy size, and it was the rights and privileges which he gave to students that tempted them, in such great

numbers, to go to Italy for their education. It was this growth that created the need of Padua and Pisa universities, although the latter practically began its existence in Florence. Frederick II, grandson of Barbarossa, while he was Roman Emperor, established a university at Naples, but made the medical school at Salerno a department thereof and forbade the starting of any other medical school within the kingdom of Naples. Notwithstanding this monopoly Salerno began its decline. A new era was upon the world. The friction between Ghibelines and Guelphs had compelled men to think, and this independence of thought prepared the world for higher things which conservatism refused to accept. The death of Salerno as an educational center was thus foredoomed because it refused to keep abreast of progress.

All visitors to Rome visit the Vatican Palace. Comparatively few take the trouble of turning aside, from the Coliseum, to go and see the not far distant Lateran Palace and its wealth of historic treasures. The former is the home of the present pope, the latter the homes of the early popes from the time of Constantine up to the year 1309. Owing to the troubles between the popes and the emperors, which culminated in the imprisonment of Boniface VIII, and his death in a few months thereafter, his successor, Clement V removed the seat of the papal court to Avignon, France, where it continued till 1377 from 1309.

In order to see Avignon the writer took a detour from his intended course, visited southeastern France, and thus made the acquaintance of the original "Windy city." Two objects inspired my movement in this direction. It was my desire to see the last resting place of John Stuart Mill and his beloved wife, and to become acquainted with the early haunts of the man who turned the world from the darkness of the dark ages to the luminousness of the Humanities. The immortal Petrarch was born near Florence, Italy, but his father having been banished from that city, along with the world-renown-

ed author of *The Divine Comedy*—Dante—drifted to Avignon. Both Dante and Petrarch, being what were called White Guelphs, got into trouble with the more orthodox Black Guelphs, had their property confiscated, and were banished from Florence. They were treated as Ghibelines and, therefore, as enemies of the city and of the pope. To this banishment the world appears to owe much. But for it Petrarch would probably never have lived at Avignon. But for it he would, most likely have been, like his father, a lawyer instead of a priest. But for it there is no likelihood that his emotional nature would have received the strain that moulded him into the foremost poet of his age. But for it we have little reason to believe that he would have become the chief apostle of the Humanities. The story of his preparation for the part he has played in this world's development is one of pathos and of romance. As a young man he was a devoted Catholic and very pious. Soon after taking holy orders he met in the church of Santa Clara, Avignon, a pretty young woman, the first sight of whom captivated him. He thought he had never before seen anything so beautiful. On several successive occasions he met her again, but never reached close acquaintance. To his consternation he soon learned that she was the wife of another, so that there were two most serious obstacles between them—his vow of celibacy and her marriage. He struggled against his passion until he thought he had completely mastered it. Some years later he and his brother took a walk from Avignon and climbed Mont Ventoux for the first time. The day was a most lovely one, the sky and air faultlessly clear, and the scene intoxicatingly enchanting. Behind him lay the snow clad peaks of the peerless Alps. Before him was the long green valley of the Rhone dotted with villages, forests, castles and cities. Beyond this were the curving summits of Les Cevennes. To the south lay Marseilles with the blue waters of the Mediterranean, laden with the fleets of many nations, and



MONKS CEMETERY AT ROME.

framed in a curving coast of bewildering fantasy. He was enraptured and felt as if this must surely be a foretaste of paradise. Looking far down the mountain toward its base his eyes rested on Avignon, he thought he could see the church of Santa Clara, and in his ecstasy the beauty of his surroundings called up again the beauty of that face which he had striven to forget. In an instant the old spell was upon him, and in order to get the mastery of himself he took from his pocket the "Confessions" of St. Augustine that, as a priest, he always carried with him. In the very height of his ecstasy he opened the volume at random and, to his consternation, read: "Men go to gaze on lofty mountains and the mighty waves of the sea, and the wide currents of rivers, and the vast extent of ocean, and the circling courses of the stars, and they overlook themselves." The book fell from his hands as he raised them to his tear dimmed eyes. He saw in this the hand of God. Again picking up the fallen volume he started hurriedly down the mountain, with a heavy heart, and full of shame and contrition he went that night to his confessional. Thenceforward he was a different man. His heart was toned to a new passion—that of poetry. His verses were well received and when he touched the chord of the love—the lost love of Laura—his Madonna Laura—he caught the ear of the world. His Latin epic of Africa next won him distinction among the learned, and it was not long before he was crowned Roman poet, in the Holy City. The author of the article "Petrarch," in the British Encyclopedia, says: "The ancient and the modern eras met together on the Capitol at Petrarch's coronation, and a new stadium for the human spirit, that which we are wont to style Renaissance, was opened." This occurred in April, 1341. Six years later Black Death entered Central Europe, by way of Genoa, and spread itself all over that continent. In April, 1348, Laura died of the plague, and in the same year he lost, from the same disease, many of his nearest and dearest



friends. Ever after his poetry assumed a still graver type, and his "In Morte di Madonna Laura" is one of the saddest ever written. Two years later he met and made the acquaintance of Boccaccio, at Florence, and from the friendship that sprung up between these two great scholars it would be difficult to estimate the good that has come to this world of ours. Through their united efforts the shackles were broken and removed from the intellects of men. Their humanism was the vital element that made universal education possible. To them belong the credit of having determined the revival of learning and the destruction of the mental slavery of the dark ages. Without Petrarch Boccaccio could have done little, and to Petrarch belongs the credit of directing aright the mind of Boccaccio. In medical reformation the sledge-hammer blows of Petrarch were well aimed and effective. His book upon "My Own Ignorance and That of Many Others" was a most scathing indictment of the medical practice of the fourteenth century. He deemed their teachings narrow and impious. Narrow they certainly were whether they were impious or not. None dared to deviate a hair's breadth from the traditional letter of Galen or, if not direct Galenites, from the interpretations of Averrhoes. The shock of his attack was needed and the result effective. The horror of their helplessness in facing the terrors of the successive waves of plague lost them much of their ancient prestige. Petrarch had good cause to be sceptical and the public came to prefer quackery to the science, such it was, that they represented. But they were not entirely to blame for their helplessness. The church ascribed pestilence to the "pleasure of the almighty God," and a terror stricken people could scarcely be expected to be amenable to reason. If it was God's pleasure that so awful a disease should devastate the land what help could any one hope from human efforts. Again, the church took from them all right to dissect human bodies so that for knowledge of

anatomy they were tied to that of quadrupeds.

A bull of Boniface VIII, excommunicated whoever dared to dissect a human body. This was issued but a few years before the so-called "Babylonian captivity of the church"—the removal of the Pope to Avignon. It would be hard, however, to say which were the most superstitious, the doctors or the priests. Both were to some degree above the masses, but both were compelled to pander to a condition of ignorance that was condoned rather than condemned. The doctors did not have a free field for their efforts, for not only was there the usual "domestic" superstition regarding the proper care of the ailing, but there was, likewise, direct competition from the monks. For centuries these last named had been making good livings by charging large fees for remnants of ancient martyrs, waters of reputed holy wells, and portions of the "true" cross. Where these failed, or were deemed inadequate, prayers to saints were substituted, on the theory that these saints would intercede with Christ in behalf of the sufferer.

St. Anthony, the founder of their order, having a great reputation as a healer of the sick, was petitioned in behalf of all sufferers from "sacred fire," or St. Anthony's "fire," names they gave to erysipelas. Most pictures of this saint show a fire by his side as typical of his power over this trouble. St. Valentine, who miraculously healed the deformed son of the Greek rhetorician Craton, was invoked for the cure of epilepsy and kindred disorders. St. Vitus, who was reputed to have healed the child of the emperor Diocletian, and whose father claimed to have seen him while in prison, dancing with angels was appealed to in behalf of those suffering from chorea, i.e., St. Vitus' dance. As insanity, and some forms of poisoning, manifested themselves in symptoms that simulated dancing this saint was likewise appealed to for these. In treating sore eyes the appeal was made to St. Clara, and in cases of toothache St. Appollonia was called upon for help. The theory that led to the reliance upon St.

Vitus, in chorea, was a very ancient one, although generally accredited to Paracelsus. Many medical men of early times did not hesitate to use it as a guide, as it conformed well with the religious conceptions of those times. Known by the name of the doctrine of signatures it affirmed that God had stamped on many things marks which indicated that he intended them to be used for the healing of the sick. It was a sort of *similia similibus* idea, inasmuch as colors similar to jaundice were believed to mark the plants capable of curing that affliction. Only plants with yellow flowers were deemed appropriate as remedies therefor. For blood diseases blood-root was deemed a proper remedy, and in case that could not be procured red flannel might take its place. This notion still lives even in civilized America. There are great numbers of plants that now bear names indicating this idea of curative virtue. Bright-eye, kidney-wort, mandrake, golden-seal, Jew's-ear, etc., are among the best known. These, of course, are English names, and only include the English phase of this delusion, but they answer better, as an illustration of the principle, than would unfamiliar Latin ones.

In olden times scrofula—general tuberculosis—bore the name of king's evil because of the then universal belief that royal persons had the "gift" of being able to heal this disease by the "laying on of hands." Dr. John Brown, surgeon to Charles II, of England, wrote a learned treatise to demonstrate the truth of this kind of healing. His royal master, during his reign, touched nearly 100,000 people for this disease. Not until the ascent of William of Orange was any effort made to check this kind of superstition in Great Britain. The first and only patient that he was willing to touch he rebuked in these words: "May God give you better health and more sense."

No better illustration of the mental attitude of the great masses, during the time of Petrarch, can be produced than that of their ideas concerning Caterina Benincasa of

Siena. Because this girl, a dyer's daughter, and a hysterical cataleptic, flogged herself till the blood streamed from her body, refused to comb her hair or wash her face, lived upon uncooked vegetables, wore a chain of iron around her body that gradually ate its way into her flesh, claimed to be in communion with Christ three times a day, fell into frequent trances, and finally, as testified to by her confessor, father Raimondo, received upon her hands and feet a supernatural impression of the scars and wounds that Christ had after being nailed upon the cross, was almost universally acclaimed a sacred person. This last so-called miracle is said to have occurred during a trance, which she had immediately after receiving the sacrament. As soon as she came out of it she called father Raimondo and said to him, "Be it known to you, my father, that I now bear on my body the marks of the crucifixion of our Lord Jesus Christ." She described to him the vision she then had in these words: "I saw the crucified Lord descending towards me with a great light, which caused me, from the impetus of my soul to meet its Creator, to raise up my body. Then I saw five bloody rays descending from the scars of his most holy wounds, and directing themselves to the hands and feet and heart of my body. Upon which knowing what the mystery was, I exclaimed, O, Lord, my God, let not, I pray you, the scars appear externally upon my body, it is enough for me to have them internally. Then while I was yet speaking, the rays, before they reached me, turned from blood-color to a pure and splendid light, and touched the five parts of my body—that is my hands, my feet, and my heart." This young woman was canonized by Pope Pius II, and thenceforth has been known as Saint Catherine of Siena. That her power over the men and women of her time must have been very great is attested by the fact that whereas Dante, Petrarch, the princes of the church, the greatest and best men in Italy, had striven in vain to persuade the Popes to leave Avignon and return to

Rome while she, a practically insane young woman, was able to succeed. In the summer of 1376 she proceeded to Avignon, pleaded with Gregory XI, and against his own interests and the interests of his own country of France, caused him, in the September of that same year, to return to Rome. Mr. Heywood, in his *Guide to Siena*, tells us that "it would hardly be too much to say that, for many persons, Siena is simply the town of St. Catherine." The House of St. Catherine is one of the first places that the local guides take tourists. It was here that she was born. It was here that she had her vision of betrothal to the Infant Christ and that has become a favorite theme among painters. In this building are kept many relics of this saint and celebrated artists have decorated its rooms with the best of their art. The Hospital of Santa Maria della Scala is where she acted as nurse during the plague. In the chapel of St. Catherine, of the church of San Domenico, there is a shrine in which is kept her head. Baedeker stars the frescoes, by the celebrated artist Sodoma, that adorn this chapel and pronounces them "admirable." The graffito pavement is said to represent Esculapius, but this has been questioned by Mrs. Alcott. In death, as in life, St. Catherine has been honored in a manner that can leave no room for doubt of the high estimate in which her fellow citizens, held her. In our day she would be consigned to a mad-house, if she attempted such antics as artists, historians, and her father-confessor declare her guilty of. Yet it was these very acts, and not her devotion as a nurse, that won for her the favors she received. No Hindoo fakir ever went to greater extremes of wild fanaticism. Never did the Hindoo people pay more reverence to their insane "holy men" than did the people of Italy to this woman.

When we pause and try to picture the mental condition of the then best civilized part of the earth, and of some of the best people of that time, as displayed in their reverence for St. Catherine, how is it pos-

sible for us to refrain from feeling that Petrarch's work was needed and needed badly. The so-called educated masses required enlightenment in order to permit of the use of enlightenment in treatment by physicians. If, in this age, the scientific medical man is held in check by popular superstition what must it have been at that period in the world's history? Petrarch appeared none too soon as the high priest of popular enlightenment. What if it was carried on as a fad by many the results show that the earth was ripe for it. He inspired men to start libraries, collect coins, relics and other material for museums, study classical authors of every kind, and drove medical men from the slavery of a single master to the freedom that came from many. In many ways he was very narrow himself, but his wide scheme of catholic conception made him build better than he knew. The foundation he laid wiped out narrowness of vision for many, and its results are still wiping out narrowness of vision for more.

But for the reform of mental method which he started it seems impossible to conceive of there having come into this world, at the time they did, the men of whom we are so proud today. Strike out Petrarch and it surely looks as if we could have had no Vesalius, no Malpighius, no Harvey, no Caesalpinus, no Realdo Columbus, no Fabricius, no Galileo, no Copernicus, nor any of the free minds who dared to defy tradition and sacrifice their comfort in behalf of natural knowledge. Humanism was the survival of a fitness that very quickly gave us the great universities of Strasburg, Nuremberg, Basel, Augsburg, Heidelberg, and all other great institutions of this kind. Had it not broadened men's minds it is hard to see how we could have reached the conditions that gave us a Christopher Columbus, a Vasco de Gama, or a Magellan. The great Professor Emil du Bois-Raymond, in an article upon Civilization and Science, published in the Popular Science Monthly many years ago, in referring to this period of the

world's development says: "The best minds of the time expended no end of labor and ingenuity in distinguishing between absurdity and nonsense. Like a plant in the dark, the ancient philosophy put forth colorless and weakly sprouts which sought the light mainly in two directions, platonistic tendencies finding expression in an insane gnosticism, and Aristotelian tendencies in barren scholasticism. Scholasticism held the ground longest, and the scholastico-ascetic period will always remain as a warning to show what length the unaided human mind, divorced from the world of reality, and without the revelation of Nature can go astray. Inasmuch as humanity recovered from this madness through the study of the ancients, revived by Petrarch and Boccaccio, the next ensuing stage of development is called the stage of humanism. \* \* \* \* \*

As we have seen, the ancients knew nothing of natural science, in our sense of the term. Is it not, then, a very curious circumstance that the resuscitation of classical studies should have given the impulse to the development of modern natural science? That the ancients, who themselves could not think scientifically, nor experiment, nor even observe, should now, by their teaching and by their ideas, produce a race in whom these faculties were to go on steadily and incessantly developing—a race bearing to the authors of its intellectual culture the same relation as subsists between a brood of ducks and the hen that has hatched them out?"

It was simply and wholly due to the emancipation of men's minds from the control of the bigots who scented danger in every new truth and considered themselves the ordained of God for the censuring of all ideas that did not seem to suit their fancy. Slowly but surely we are learning that the men of new ideas are the men to be encouraged, while the men who refuse to let mankind know that a new idea has facts behind it are the worst enemies of the race.

## IBERIA AND LUSITANIA.

MUCH as medical science owes to the crusades, and great as is its debt to the renaissance, it could not have reached its present altitude but for the discovery of America. Had Christopher Columbus failed in his venture we would have had no voyage of the Beagle, no explorations of South America and the Pacific Islands by Darwin, no studies of the fauna and flora of Netherlands India by Wallace, and no deep sea researches of the Challenger. Take these away and what would happen to our modern doctrine of Evolution, how much would we know of the causes of adaptations, and where would we stand in relation to modern biology, with its physiology, bacteriology, protozoology, pathology, and principles of immunity? To the mind unaccustomed to tracing historical effects to their causes it would probably appear as if we could have had all of the latter without the former, but, to one who with a scientific bent of mind insists on knowing why things are as they are, the answer is obvious. Had there been no Columbus we could have had no cinchona or quinin, no erythroxylon or cocain, and none of the other remedies that this new continent has added to our materia medica. Nor could we have had india rubber for the multitude of uses to which it is being put by surgeons, gynecologists, and general practitioners. If we inquire why Columbus dared to make so hazardous a voyage and why Ferdinand and Isabella finally consented to risk their money on such a venture we will discover that it was because it was deemed a paying investment from the view points of commerce and conquest. If we ask regarding the character of the commerce that



acted as a tempting bait we learn that it was spices, balsams, antiseptic gums and just such goods as were required by the medical men of those times. If we ask for the names of those who made such a voyage possible at that time, we will learn that the venture would have been an insanely hopeless one, but for the astrolabe invented by the two physicians of John II of Portugal. By its aid, for the first time in the history of the world, it became possible for sea-faring men to tell their latitudes and longitudes when far out of sight of land. The world remembers Columbus but forgets Drs. Roderigo and Joseph, without whom Columbus would not have been heard of in our day. If we ask who it was who supplied Columbus with the chart of the earth which he used in order to guide himself, the chart he used in order to convince Ferdinand, Isabella and the friends secured at their court, of the truthfulness of his speculations, we learn that it was drawn by Dr. Paola Toscanelli, a Florentine physician, from the few really scientific facts known at that time. If we ask who it was that came to the rescue of Columbus' theory, when the royal junta had given what was to have been a final and irrevocable decision against Columbus, we learn that it was the scientific friend and councilor of the former father confessor of Queen Isabella, at the convent of Santa Maria de Rabida. Had Dr. Garcia Fernindaz, of Palos, refused at that time to strengthen the convictions of the head of that monastery there is little likelihood that Columbus would ever have sailed in the Santa Maria, which was named from it.

In order to fully appreciate the motive that led to the daring act of Columbus, let the reader go with me, in imagination, to Genoa, the city in which Columbus was born. Our trip, however, must predate the birth of the great navigator by over a century. We will visit the prison of that city in 1299. Within one of the dungeon cells we will discover a prisoner of war on whose words were hanging the destinies of mil-

lions of human beings yet unborn. During the year 1298 the commercial rivalry of Genoa and Venice had reached such a point of angry fervor that fleets from the two cities met in mortal combat. Genoa won and took 7,000 Venetians as prisoners of war. The hero of our story was one of these prisoners. In order to pass the dreary nights and days of a year's incarceration he recited to a fellow-prisoner some of the principal events of his life. The listener being captivated by the narrative, and being a good penman, committed each day's portion of the story to paper. When they were freed this record was published and it was to it, more than any other single circumstance, that Columbus owed his success. From the facts of this narrative Dr. Toscanelli was able to construct the chart which Columbus used. It was the implicit faith which the Spaniards had in this narrative that made the proposed voyage seem so alluring. It presented to their imagination visions of wealth for Spain beyond the wish of avarice. The Venetian prisoner was the now celebrated Marco Polo and the narrative his tale of the wealth and splendor of the countries of far eastern Asia. Venice had become immensely wealthy through its importations of spices and Asiatic gums. Alexandria had waxed rich on the duties it exacted from Venice for letting these goods pass through Egypt. The Pope had given to Christian countries full ownership in all heathen lands that they discovered and started to Christianize. In that day this meant the same to the people of Europe that a guarantee deed to a city lot now means to an American. To reach eastern Asia by sailing to the west meant the securing of immense land possessions and the ownership of these lands meant the taking from Venice and Alexandria their commercial supremacy. The one great doubt of those not swayed by religious tradition was regarding the ability of Columbus to cross the unknown seas. Spain held him, under dribblets of pay, for many years in order to keep him from going to some other country and mak-

ing the same offer to another king. Fearing to make the venture itself it, nevertheless, feared still more the possibility of another country doing the thing it hesitated to do. When, at last, Ferdinand was about to accept the offer of Columbus, his courtiers objected to Columbus demand that he be made governor of the discovered regions. This was proof that they had a strong suspicion that Columbus was right and that he would, by such an arrangement, become greater than the greatest of themselves. And all this was due to their belief in the prison-written narrative of Marco Polo. But this was over a hundred years later than the writing of that narrative. Much had been learned during that hundred years and that much all went to confirm the strange story of the Florentine prisoner. The great Moorish traveller, Mohammed Ibn Batuta, followed by others as daring, had seen much of what Polo saw and returned to confirm the prison-written tale. Importers had pushed their way into these same regions and rapidly became wealthy by the trade they secured. But, alas, for poor Marco Polo. The story he told proved to be his undoing. His fellow-citizens stamped him as the most incorrigible liar that ever set foot in a Venetian gondola. Not until he was long dead did people begin to believe him. He was nicknamed "Marco Millioni," meaning Mark the thousand-fold liar. The court that faced his home bore, for generations, the uncomplimentary title of "Corte del Millioni," or place of the superb liar. Long after his death Venetian comedians appeared upon the stage under the name of "Marco Milioni" and amused the crowds with Munchausen stories. By a freak of fate, if not by design, the site of his home is now occupied by the Malibran Theatre. It is within five hundred feet of the well-known Rialto.

In order to follow Columbus during the many trying years of his sojourn in Spain, and in order to get some idea of the part played by the Spanish in the evolution

of medical science, we spent five strenuous weeks of unbroken travel in the land of the Cid. We entered Spain from France by way of San Sebastian. We intended turning aside at Bayonne in order to visit the celebrated shrine at Lourdes, but being behind in our itinerary had to abandon the idea. This remnant of the dark ages, existing near the border of Spain, would have made a fitting contrast to the better elements of Spanish medical practice. While we missed Lourdes we did not miss Burgos or Monserrat. Burgos has a cathedral that transcends the power of my pen to describe. Its architectural beauty has been referred to as the perfection of petrified religion. Its wealth of polished and carved woods and precious stones is worth more than a king's ransom. its beauty is the very best of an age of architectural beauty. Its altars, its chapels, its cloisters, are sadly disfigured by a needless display of votive offerings that tell of abject medical superstition on the part of the people. Every available spot is hung over with beads, crosses, scapulars, and wax images of maimed and distorted hands, feet, fingers, toes, heads, legs, bodies, etc. The entire human anatomy seems to be represented in dissected sections. These were hung up by the ailing, or their friends, under the delusive hope that the saint to whom the spot is dedicated will cure them of the ailment of which the offering is a symbol. After seeing these we could no longer wonder at the adoration of the average Spaniard for that prince of hypocrites, his "all adorable, wonderful, most excellent, grandest, most magnificent champion"—the Cid. It takes ignorance to see great qualities in such a character. As Burgos was the home of the Cid we visited the place where he was buried. The climb gave us an excellent appetite for our dinners, but this first dinner in interior Spain will long be remembered. We could eat nothing that was placed before us. Everything *looked* appetizing. There was fish, flesh, fowl, eggs, potatoes and pastry in abundance. The

bread was like sailor's "hard-tack" and sour. Every article placed before us was flavored with a nauseous combination of garlic and olive oil. Every tourist has this to face whenever he leaves the frontier cities or the capital. We asked for butter and a tin can of the article was laid before us. About fifty per cent of its weight was salt and it looked like so much axle grease. Our host tried every



MEDICAL HOSPITAL, TOLEDO.

conceivable way to please us, but we were not Spaniards and could not enjoy Spanish cooking. As Spaniards never eat butter the sole supply is the canned article, that is imported from Denmark for the special benefit of foreigners like ourselves.

As in Burgos, so also on Monserrat, we found a cathedral that was a veritable museum of wax models of deformed limbs, rosaries, pieces of garments, and other votive offerings of the sick. For ages this has been the rendezvous of kings, queens, princes, dons, and of the general public, when in search of health and religious consolation. Offerings of many kinds are made here to the image of Nuestra Senora de Monserrat. There probably is not on the whole earth another spot of equal size that

possesses so varied a series of attractions for an intelligent tourist. The mountain, like that of Fusi-yama, in Japan, dominates the scenery for many miles of country, because of its lonely majesty. Its weather-beaten crags have no equal for weird, grotesque nature-sculpture. This, the Mountain of the Holy Grail, is a most fitting place for a religious romance like that of Parsifal. There is woven around it such a wealth of legend, and fascinating history, that one could spend months in studying it all. Its paths, monuments, ecclesiastical buildings, rich verdure, immense, highly colored precipices, deep gorges, and strangely costumed monks, make it well worth a long journey to see. As the funicular railway slowly lifts the tourist toward the monastery and as he looks far down to the valley below, he is reminded very much of the view of the Grand Canon of the Colorado from Hance's Trail. Within sight of the monastery is the cavern in which Ignatius Loyola spent nearly a year of self-abnegation preparing himself for his mission of founding the Society of Jesus, now better known as the order of Jesuits. In front of the image of the virgin, in the chapel of the monastery, he made his vow of consecration. It was his priests who, in later years, gave to the world its first organic specific remedy against disease. They were the first white men—and perhaps the first human beings—to cure malarial fever. They supplied to the Countess of Cinchon the bark that cured her of an attack of this disease. It now bears her name because she had the first supply of it sent to Europe. For generations before quinine had been extracted from it the popular name was Jesuits' bark or Jesuits' powder. The Jesuit priests imported great quantities of it to Europe, charged large prices for it, and helped maintain their foreign missions thereby. The medical profession fought against its use. The Paris faculty, and professors of therapeutics generally, heaped all the abuse upon it that they could. As late as 1792, Dr. Kanold, a leading physician of Breslau,

permitted himself to die of a pernicious quartan fever, declaring the while that he would rather die than use the "quack" drug. Such independent reasoners as Sydenham, Peyer, Albertini, and Torti, refused to follow the lead of conservatives, and so tried it. But for these men the profession would soon have been disgraced. The ostracised Paracelsus did not hesitate in advising his followers to try it. But for the dogged determination of this man we would have had no laudanum for pain and no mercury for syphilis. He taught in Basle, Switzerland.

Here we are reminded that the introduction of syphilis into Europe seems to have occurred soon after the discovery of America and may have been brought by the Spanish sailors. What knowledge of disease we may have acquired from this malady we should, probably, credit to Spain.

Monserat is not far from Barcelona, a beautifully situated city on the shore of the Mediterranean, where every well-to-do citizen vies with every other in the outside decorations of his home. No other city can compare with this for fancifully carved and scene-painted fronts. Money we spend on interior decorations here seems to be spent most lavishly on the outsides of their houses. It was here where Ferdinand and Isabella gave Columbus his royal reception on his return from his first voyage. On the route from San Sebastian to Barcelona there are two points of historic interest to medical tourists. These are Tudela, the birth-place of Michael Servetus and Saragossa, where he acquired his early collegiate education. Later in life he graduated in medicine at Paris where he afterwards succeeded his teacher, the great Vesselius, when the latter removed to Padua. While acting as demonstrator of anatomy his anti-Galenical views and his theological views got him into trouble with the rest of the faculty so that he had to quit Paris. He then practiced his profession, first in Avignon and then in Charlieu. While in Paris he became acquainted with Calvin, the world renowned

theologian. They discussed together questions of religion. While Calvin was at his home in Geneva he and Servetus corresponded together. It was these letters to Calvin that fixed the authorship of "Christianismi Restitutio" upon Servetus. Being caught, while on a visit to Geneva, he had to stand trial for heresy, was found guilty, and, on refusing to recant, was burnt at the stake as a heretic. He escaped from the inquisitors of Catholic Spain to suffer death at the hands of the inquisitors of Protestant Switzerland. The blue waters of the beautiful lake of Geneva received his ashes while the smoke from his burning body was wafted toward the snow-capped summit of Mont Blanc. What a horrid sight with which to desecrate so lovely a spot. They asked him to pray: "Jesus thou eternal son of God." He showed his stubborn will in behalf of what he believed to be truth and to the last repeated: "Jesus thou son of the eternal God." Because of the difference in meaning between these two brief sentences he was condemned to die a death that only a savage could devise. The difference is so subtle that many are unable to grasp it. But to the medical man the volume that brought him to the stake is of peculiar interest. It contained the earliest, non-Grecian statement of the circulation of the blood. It lacked the perfection which Harvey gave to that doctrine, at a later date, but it was a wonderful anticipation of the same. As Servetus died in 1553 and Harvey was not born until 1578 the relationship is apparent. Our double interest in Servetus as philosopher and medical man determined us to make a stop at Saragossa. The Spanish pronounce it Thar-Agatha, and it is a corruption of Ceaser-Agustus for whom it was formerly named. We happened there at the "fiesta" of the "Virgin del Pilar." The city was crowded with pilgrims dressed in the most fantastic of holiday attire. Strange shaped hats, many-colored mantillas, immense leather belts, jewelry that a Hindoo would have envied, stilletas innumerable, and



donkeys of many sizes appeared everywhere. Until we saw those costumes we deemed stage representations of Spanish life exaggerations. Now we know they are not. Many a Sancho Panza could be seen riding his donkey among the crowd with here and there a Don Quixote on horseback. In the latter the saddles, bridles, stirrups, and spurs, were fearfully and wonderfully made. A rich lady's trousseau could scarcely display more expensive work. We visited the del Pilar Cathedral and were guided through its chapels and aisles by one of its priests. The edifice is believed to be built on the exact spot where, about 1900 years ago, the Virgin Mary appeared to St. James. The pillar on which she stood occupies the center of the cathedral, and is polished and worn into a most fantastic shape by the lips of many centuries of kissers. An image of the Virgin now surmounts this pillar and to it the multitude appeal for intercession with Christ and for relief from disease. As we pushed our way among priests, nuns, boys, girls, men, and women all devoutly praying with uplifted hands, or crossing their bodies in the intermissions, we felt almost as if we were guilty of sacrilege and frequently hesitated to proceed. Our priest-guide had no such compunction of conscience and so hurried us along. On gaining the street we saw numerous bevvies of "Spain's dark daughters" who did credit to Byron's description of them in *Childe Harold*. We stood where the Maid of Saragossa, "Hung so fiercely on the flying Gaut, foiled by a woman's hand before a battered wall." When her lover was shot she seized his rifle and re-encouraged the 220 daring men just as they were going to fly. She shamed them into courage and that day they beat back 18,000 French soldiers. Byron has depicted it. From here we proceeded to the interior of the town. There we saw the historic spot which inspired Verdi to compose his *"Il Trovatore"* and nearby was the Castle of the Giants that took us back in memory to our nursery tale of Jack the

Giant Killer. There, carved in solid stone, are huge images of the very giants that adorned the pages of our story book.

On leaving Saragossa, as on two other occasions, we experienced the inconveniences of Spanish methods of conducting railways. It is a rare thing for an express to travel by daylight and only happens when the distance gone requires more than twelve hours. They are usually corridor sleeping cars. Unless the passenger secures his berth a day in advance none can be bought. Every



MILITARY HOSPITAL, GIBRALTAR.

berth is, as a rule, occupied. The company will not put on a car which they are not morally certain will be full. At any way stations and crossings the would-be passenger finds the train in which he hoped to proceed, with every car labelled, "Complete." He must either telegraph to the starting station and secure a through berth for the next night, or he must take a slow day train in the morning. If he telegraphs he must pay for the entire distance that the train goes. Some few express trains carry day coaches, and if they are not labelled, "Complete," he can secure a seat in one of these by paying a supplemental fare. These trains are denominated "Rapide," although they never

exceed 35 miles per hour. Only first-class tickets, plus a supplementary fare, will be accepted. All time tables give the times of trains on the twenty-four hour day. Strangers must learn what is meant by 18.35 or 19.24 o'clock in order to know when to catch a train. Only sleeping cars have accommodations, like toilets, and as other trains are slow with, sometimes, great distances between stations, and stops of only about five minutes, it is easy to imagine the condition. If one tries to reach a point other than Madrid, except by going through Madrid, he will find that the long way around is always the quickest way across. No shortcuts are possible on Spanish railways except at the cost of an enormous loss of time. We were compelled to visit Madrid six times when once should have been enough. It was there that we saw the barbarous, stupid, cruel sport—the bull fight. It is not a sport that requires skill, and when a man is gored it is due to his being off his guard by becoming absent-minded. Horses are gored purposely to excite the stupid crowd. Every move of the bull can be foreseen by any intelligent onlooker. The present queen of Spain does well to discourage such sport(?). We saw her and the king at short range, as their carriage passed near us on a street near the palace. She looks like a very intelligent young woman. The king looks bright but is small in stature so that his appearance is very boyish.

Our visit to Salamanca was made from Madrid, by way of Medina. The last named place is where Queen Isabella is buried and as it is a junction we had to spend the night there, so that in that way we had a fair opportunity of seeing the girl-home of Isabella, and her last resting place. In order to save a day it was necessary to bribe a railway conductor to let us ride on a box, in the corridor of a "complete" train for a distance of about forty miles. He positively refused to look at any small amount, but finally yielded when he saw the value of five American dollars. To have missed that train would

have spoiled our visit to Salamanca and endangered us of losing an all-night ticket for a sleeper on another line, which we had secured before leaving Madrid. From Medina to Salamanca is within the ancient Roman province of Lucitania. Madrid, Barcelona, and most other points we visited, are within that of Iberia. On reaching Salamanca, and wandering through its quaint streets we found it hard to realize that this was a city long before the Christian era. It still shows signs of early Greek connections. Hannibal captured it in 217 B. C. It has had Roman, Goth, Saracen and Christian masters. While in possession of the Moors its University was started and the liberal views that then obtained held it back from the wild fanaticism of the inquisitors. Ferdinand and Isabella asked that the university professors give Columbus a hearing to decide on the practicability of his proposed voyage. The hearing occurred in a nearby convent. He won over the most liberal of the faculty. Every argument that he presented, however, was met by the conservatives pointing to Ezekiel fifth chapter and fifth verse. Every medieval map of the world was made with Jerusalem in the center in order to conform to this text, and most of them had it printed on their margins. When he told them of the strange colored and strange featured men who had been cast up by the tide on the coast of the Canaries, of the strangely carved woods that had been found at the Azores, of the statements of Ptolemy, whom they pretended to accept as a guide in matters of this kind, all they did was to ask him to explain Ezekiel's words: "Thus saith the Lord God; this is Jerusalem: I have set it in the midst of the nations." There was no getting around this passage without endangering one's life by the inquisitors. Columbus and his backers could only remain dumb. They dared not discredit holy writ and they could not say that it was Ezekiel's mere opinion. In vain did Columbus quote to them the remarkable and prophetic words of

Seneca, where he says: "At a distant date this ancient world will westward stretch its bounds, and then disclose beyond the main a vast, new continent, with realms of wealth and might." In logic the fight was a tie. In numbers the conservatives won, as they always do at first, and so Columbus lost..

Before leaving northern Spain we visited the Escorial, Valladolid, Tarragano, Toledo, and other points of interest. At Valladolid we saw where Columbus died, where Ferdinand and Isabella were married, and where Cervantes lived. At the other points we saw much of interest, but to enumerate them would swell this communication into undue proportions. On reaching Cordova the Moorish mosque—the finest in the world—and the many evidences of former Moorish supremacy, reminded us that this was the birth-place of that prince of Mohammedan physicians Averrhoes. Columbus, too, lived here and probably spent more time here than in other Spanish cities except Seville. Averrhoes had also lived at Seville and was for sometime *cadi* there. His writings, next to those of Galen, swayed the opinions of the medical men of Europe most. All other medical writers of those times took a subordinate place. Padua, that did so much for medical progress, was the seat and center of Averrhoism. So long as Averrhoes let theology alone he was honored and respected by his Mohammedan neighbors, but as soon as he ventured into the realm of theology trouble began. The devout ones tried to get him executed, but they only succeeded in getting him degraded. He was driven out of the part of the city occupied by the faithful, had his property confiscated, and on several occasions was compelled to stand unturbaned, and with tied hands, in front of a mosque when the faithful entered to pray. It was the duty of the latter to spit upon his face, both going and coming, and the small boys were taught to pelt him with dirt and stones. Long after he was dead Erasmus spoke of him as "The impious and thrice accursed Averrhoes." Petrarch refers to him

as "A mad dog barking at the church." In Dante's *Inferno* he is pictured as seated in hades along with Hippocrates, Galen, and Avicenne. Most of his writings, in manuscript form, are being preserved in the library of the Escorial. If Philip II, could have foreseen this he might have ordered that building, that cost him so much, destroyed. As *cadi* of Seville, Averrhoes never endured the agony that came to Columbus in that city,. It was there that the latter received what was intended to be a last and complete dismissal to his suit from Ferdinand and Isabella. The junta appointed to make a final decision upon the matter definitely pronounced his scheme unworthy the further attention of their majesties. He received the message in despair. He had been held in Spain by Will o' the Wisp promises, during the best part of his life, and to be thus dismissed at last was a staggering blow. Heart-broken he and his little son, Diego, started on foot, for the home of his brother-in-law, at Huelva, fully determined to sail from there to France and leave Spain forever. Tired, hungry, and thirsty they reached the monastery of Santa Maria de Rabida, where they waited for some passing boatman to row them over the Tinta River to Huelva. Columbus begged some bread and water for his boy from one of the monks, and while it was being eaten the prior happened to pass and engaged in conversation with the father. Naturally the conversation turned on where Columbus was going and why he was about to leave Spain. As soon as the prior had taken in the situation he sent to the nearby town of Palos for Dr. Garcia Fernindaz, the scientific man of the place, and Martin Alonzo Pinzon, the richest merchant of the region. As soon as they reached the monastery Columbus again recited his story, gave his theory and the facts he had to substantiate it, after which it was thoroughly discussed by those present. Dr. Fernindaz, seeing the force of the evidence, was an immediate convert and the others promptly accepted his conclusion.

Fray Juan Perez de Marchena, the prior, immediately despatched a messenger to Queen Isabella, at Santa Fe, begging an audience with her. As her former father-confessor he felt confident that she would grant it and so he detained Columbus at the monastery till he heard from her. She ordered him to come to her immediately. There he pleaded Columbus' case with her and took back an invitation for Columbus to repair at once to Santa Fe and see her. Even then things did not move unruffled at the royal hearing. The courtiers interfered, on the plea that too much was being asked as a reward in case of success. Finally, however, the matter was settled in favor of Columbus. The Queen offered to pledge her jewels to defray part of the expenses but the treasurer of the exchequer relieved her of having to do so by assuring her that there was enough left, over the war expense, to defray the royal share of the cost of the expedition. Martin Alonzo Pinzon, personally paid for the fitting out of one of the ships and accompanied it as captain. But what a world of trouble they had in securing sailors. It finally became necessary to resort to conscription and compel enough sailors to go. Amid the tears and pleadings of mothers, sisters, and sweethearts they were forced on board by soldiers, after taking the sacrament, and receiving the blessing of the priest, at the Chapel, in Palos. From the Port of Palos, the Santa Maria, Pinta, and Nina, sailed past the monastery of Santa Maria de Rabida, into the Gulf of Cadiz. From the window of the monastery there is an extensive view off into the gulf and from there the Prior, the monks, and Dr. Fernindaz watched the three ships until they had disappeared beyond the horizon. As we looked out of the same window, over 400 years later, we wondered what would have been the condition of the earth, at present, if those three little mites of vessels had perished on their voyage. On what frail threads momentous issues hang. Although most of the romance, pathos, poetry, and prophecy of American

greatness hangs over this little hill on the sea-shore few are the Americans who do it the grace of a visit. All they seem to think of is Granada and the Alhambra, the Escorial, and the bull fights. On its summit now stands a large monument to Colon (Columbus) that can be seen for many miles in every direction. Whether the visitor goes thither by sea or by land it is the first thing he sees on passing the horizon, or on leaving the mountains. It seems to beckon to every American and ask him, if only as a duty, that he come and pay his respects to that place which, next to his own home, should be the most important spot in all the world to him. In Palos he will find the same church and the same altar before which Columbus and his crew knelt to receive the benediction of the priest. The wharf is gone, commerce has gone, and the population has shrivelled into barely four hundred, but its influence must forever remain to bless mankind. We saw Granada, we saw the Alhambra, and all the beautiful things there, which Washington Irving's pen-pictures have immortalized, but would far rather have missed seeing them than have missed our visit to Palos and de Rabida. As a small boy at school I had learned to recite the Spanish Champion, and so knew something about the Cid, but Burgos failed to impress us as being any more romantic on account of it. Not so, however, was the effect of our school days lesson concerning hungry little Diego and the good monk who gave him bread and water. The monastery door, where Columbus stopped and knocked, seemed like an old friend to me, although I had never been there before. The grounds around the monastery are now laid out in beautiful garden plots and date palms decorate the central walk. While we were there these hung laden with immense bunches of yellow fruit that added materially to the beauty of the spot. The main room of the monastery, on its upper floor, is hung with historic pictures of interest to Americans. The first shows Col-



which, unfortunately, we had to eliminate from our itinerary because of reaching that part of France over a week behind our time, few Americans ever see. It is the Yosemite of Europe. There is nothing like it in Switzerland if descriptions of those who have seen it are reliable. Its magnificent cascade of 1385 feet in height dwarfs everything of the kind in the Alps. The view from the Pic de Pimene is said to excel that from Pilatus.

While we failed to see this particular beauty-spot we did not fail to visit the one part in all of France of greatest historic and ethnologic interest to Americans and, particularly, to American physicians who have the good fortune to get there. It was in South-Western France that some of the most important events connected with the birth of our nation transpired. It was in this same region that some of the fiercest struggles in behalf of civil and religious liberty occurred. It was here that Islamism received the first decisive blow—a blow from which it never recovered—when the fanatical followers of the Koran were sweeping everything before them and appeared as if destined to conquer the whole earth. They had subdued Spain, passed the Pyrenees and taken possession of all of Southern Gaul when, in A.D. 732, Charles, son of Pepin, as leader of the Franks, completely routed the army of Abdel-Rhama and killed that Moorish chieftain not far from the town of Poitiers. So overwhelming was the victory that Charles was given the name of "Martel," meaning hammer, because he had crushed the Mohammedans as if with a hammer. Gibbon, the historian, says of this battle that "But for it perhaps the interpretation of the Koran would now be taught in the schools of Oxford, and her pupils would demonstrate to a circumcised people the sanctity and truth of the revelation of Mohammed." Following up this successful result Charles Martel continued his attacks upon the various strongholds of the Moors until, by 739,

he had driven the last of them back into Spain, consolidated the various little kingdoms of most of Transalpine Gaul, and laid the foundation for the country since known as France. In 737 he destroyed the Moorish stronghold of Maguelone and permitted the Hebrew, pagan, and peaceful Mohammedans, to build an unfortified city near the ruins. To this new city was given the name Montpellier. It is now one of the most interesting towns of South-eastern France. Its famous Place du Peyrou is one of the finest public squares in France. It occupies the highest piece of ground in the region, and one can stand there and enjoy what is, perhaps, one of the most magnificent and comprehensive scenes in any country. It embraces the distant snow-clad Alps, the picturesque rolling Cevennes, the majestic Pyrenees, the beautiful verdure-clad valley of the Rhone, and the blue waters of the Mediterranean Sea. Soon after the city was established a medical school was started, which soon became the most famous in the world. The renown which belonged to Salerno gradually faded as that of Montpellier grew. It became the single beacon light of liberal medical education for France as Padua, at a later date, did for Italy. Among its earliest students of note was Arnold de Villeneuve who, toward the close of the thirteenth century, first produced alcohol and isolated the essential oil of turpentine from pine resin. It was he, too, who first advocated the use of brandy as a remedy. He looked upon it as almost as good as the fabled elixir of life. A generation later and the same school gave us the famous author and surgeon, Guy de Chauliac. His book, "The Inventory," is one of the first really valuable surgical works ever published. He, too, gave us the first intelligent description of the symptoms of bubonic plague. When the great epidemic of this disease first overran Europe he was practicing in Avignon where he held the position of physician to Pope Clement VI. He stuck to the city

and cared for the sick when the majority of practitioners sought more comfortable quarters, and when even the friends and relatives of the ailing had deserted them. Being taken with the disease himself, he was left for dead, but revived and lived to describe his own experiences therewith. It is quite likely that he had met Petrarch, and he was in Avignon when Madonna Laura died. Attached to the medical department of the University of Montpellier is the oldest botanic garden in North central Europe. Like the still older one at Padua it was started for the purpose of letting medical students have an opportunity of seeing the plants from which the remedies they were expected to prescribe came. The fine villas around Montpellier are, to a considerable extent, occupied by consumptives who choose that as their home, because of its reputed healthfulness. It was in Montpellier that M. Auguste Comte, founder of the Positive Philosophy, that was so often confounded with the Synthetic Philosophy of Herbert Spencer, was born.

Every visitor to Montpellier, who has the time, is sure to go and see such nearby towns as Marseilles, Avignon, Toulon, and Nîmes. To see the Riviera—a spot that few travellers through France fail to see—there is no better place from which to start than Marseilles, particularly if aiming at reaching Italy. Such beauty spots, along the coast, as Cannes, Nice, Monaco, Monte Carlo, and Menton everybody has heard of and need no description, but Grasse—in several ways more attractive than all the rest—is talked less about and often overlooked. Its terraced streets and farms covered with roses, lilies, jasmines, and other beautiful and fragrant flowers, is a sight to delight every one who sees it. Almost the only crop of the region is flowers that are used in the manufacture of colognes and pomades. Our visit there, and to the other places named, lingers in our memories as evidence of the truthfulness of the saying that "a thing of beauty is a

joy forever." To describe the scenic splendor of hundreds of spots along the Mediterranean shore, from Montpellier to Menton would baffle my power. The visitors have a perfect surfeit of panoramic splendor, each view being, in its way, a repetition of that of the far-famed Corniche Road, or that seen from the tower of the church of Notre-Dame-de-la-Garde of Marseilles.

The building of Montpellier, after the destruction of Maguelone, did much for the evolution of medical science, but the indirect influences of Charles Martel's success in other directions did much more. His example led Christian Spain into rebellion against Mohammedan rule so that, step by step, they were able to regain their freedom. Boabdil, the last Moorish ruler in Spain, was conquered by the soldiers of Ferdinand and Isabella just before the signing of the commission of Christopher Columbus and, indeed, their signature to that document was dependent on that victory. As the young Moorish king looked from the Alhambra hill, for the last time, on the beautiful and rich country that he had lost, tears welled into his eyes. His stern mother turned to him and said: "Weep not like a woman for what you could not defend like a man." Little did she know of the fact that those tears presaged the discovery of a new world for man, or that Charles Martel, many years before, had started the train of events which made possible such tears and equally possible the discovery, at that time, of America. But still other events of equal importance came from Charles Martel's conquests. In his German fatherland he aided St. Willibrod and St. Boniface in their efforts at converting the pagan inhabitants to Christianity. He protected them with his soldiers and supplied them funds to help on their work. In 741 the Lombards threatened to besiege Rome and through his influence this danger was averted. After his death his son Pepin, through the abdication of his

PARIS. — Institut Pasteur, Rue Duioi



1056

brother who entered a monastery, became sole prince of the Franks. In 741 Pope Zachary, as a return of favors, made him king of the Franks. Soon after Pope Zachary died and Pope Stephen came into power. Then the Lombards again threatened the head of the church with their vengeance and King Pepin was called upon for help. He sent an army to Italy, beat the Lombards, and compelled them to give to the church, as a perpetual heritage, the duchy of Rome and a number of Italian cities, near Rome. Thus started the so-called temporal power of the Pope. When Pepin died his son, Charles, came into power. By pursuing some of the methods of his grandfather, Charles Martel, he increased the size of his kingdom and came to be known as Charles the Great, and as Charlemagne. By 796 he had conquered a large part of Europe. In 799 Leo III got into trouble with the citizens of Rome and was forced, by them, to leave that city. He sought safety in France, under Charlemagne who, in 800 A.D. replaced him in power and quailed the turbulent people of the Holy City. For this favor Leo crowned him Emperor of the world, and thus established the Holy Roman Empire of which Barbarossa was the chief glory. The rest of this part of the story we have already told.

In this coronation arose the need for that spiritual army, the Knights Templars and the Knights of St. John. It nurtured the feeling that led Peter the Hermit to preach the Crusade. It led to the establishment of our universities and, indirectly, to the Renaissance. It led to our using the red cross as a symbol for our hospitals, and a Frenchman, Adhemar, bishop of Puy, received from Pope Urban II, the first red cross of silk cloth ever worn as a symbol of the crusade. This occurred at Clermont, in Auvergne, where the Grand Council met in 1095, and where the Pope, himself, presided.

In history there occur many curious

coincidences, that though purely the result of accident are somewhat startling. One such is associated with the history of the symbolic use of the cross. Its modern adoption dates from the International Congress called at Geneva, in 1863, by the Societe Genevoise, under the guidance of M. Dunant. Then the Red Cross Society was launched into active life. This brought the union which now exists between medicine and the red cross. In the whole world one can hunt in vain for four other places so intimately connected with the triumph of the cross and the triumph of medicine as Poitiers, Geneva, Paris and Montpellier. No where else in the world can one find a spot where the first symbolic cross was given by the hand of the Christian church, to be worn in the sight of all the people as a functional emblem, than at Clermont, in Auvergne, now Clermont-Ferrand. In Poitiers the cross won its first lasting triumph over the crescent. In Geneva the red cross was chosen as the symbol of mercy and human kindness for the wounded and ailing. In Paris Christian nurtured Galenican medicine had its early home. If the reader will take a map of France and with a red pencil draw a straight line from Paris to Montpellier and another similar straight line from Poitiers to Geneva, these two lines will form a nearly perfect red cross. In outline it will be very much more nearly perfect than is the so-called Southern Cross that lies near the south pole of the celestial sphere. The lines bisect each other at nearly right angles and the two arms of the cross are nearly of equal length. During ancient Roman crucifixions the heart of the one being crucified always occupied a position a little below the bisecting point of the two lines of the cross. In this historic-geographic, accidental cross Clermont lies, in relation to Poitiers and Geneva, just as would the heart of a victim of crucifixion. The act of Pope Urban II, at Clermont, was the cortical act in the dramatic history of the red cross. In touring France Clermont

is unfortunately for us, a spot in this curious historic picture that we failed to see.

Inasmuch as Geneva is the only place where my wife could ever be persuaded to consent to my ascending in a balloon and that only on the condition that we go together so that if one of us should be killed the other would meet the same fate, the reader can imagine, if he chooses, that the light-headedness induced by that ascent may have had something to do with my discovering such coincidences. It is therefore, probably best that no attempt be made to complete the story by adding other odd relationships that have occurred to me. If these serve the purpose of fixing in the memory the important events that connect them together they will have done their duty and my consumption of valuable space in their recital will be slightly justified. Before leaving the consideration of Geneva, however, it will be well to recall to the reader's attention that it was here that Dr. Servetus was burned at the stake for the heresies contained in a book that treated imperfectly of the circulation of the blood, about a century before the time of Harvey. It was at Dole, a small village near here, in which Pasteur was born, and about midway between here and Clermont, in Villefranche, that Claude Bernard, the great pathologist and anatomist, was born. As Geneva is the most common entrance to Switzerland, by tourists coming directly from Paris, it will be well to advise all who anticipate taking such a trip to study a history of Geneva in advance, for no where else has so much of literary, scientific, and historic interest been concentrated. Scarcely a great name of the past half millenium can be found whose bearer has not spent some time in this remarkable city. The beauty of its situation is common knowledge and needs no repetition at this time.

Returning once more to the consideration of Western France, from which our historic narrative carried us, we will take a hasty





glance at the chief points of interest that were visited, learn what connections they had with the evolution of medical science, and see something of the people and their ways. In taking that part of our tour we entered France, from England, by way of Southampton, the Channel Islands, and St. Malo. We visited Mont St. Michel to see its strangely placed abbey, perched on the summit of the huge, conical rock where houses cling all around the sides and base, and to see its wonderful tide that, when rising, rushes over many miles of sandy-beach faster than a horse can run. We saw the curious St. Servan bridge, on stilts, that carries passengers across the bay as would a ferry boat. We watched the nearby bathers, and the public "Baigneurs," who are all men, caring for the ladies, who venture into deep water, and teaching them how to swim. We interested ourselves in the "Octroi" and their methods of collecting taxes on all sorts of goods that are carried into the cities for sale. In the United States we "kick" at our customs officers who go through our luggage whenever we return from a foreign land. In France they make the entrance to every town and city a port of entry, and overhaul even the cabbage and turnips of country farmers, compelling them to pay duty on every such article they carry, whether on a wagon or in a basket. No matter how small the basket happens to be, or whether it is carried by man, woman, or child, its contents are carefully scrutinized and a tax levied. We observed that all trolley cars had two conductors. One sells the passenger a ticket and the other cancels it with a punch. On railway trains there are no conductors. The passenger buys his ticket in the station, a gateman punches it as he passes to his train, and a second gateman collects it when he reaches his destination and leaves the train. There is no one to look after passengers to tell them when to leave their train. Before trains start a deep toned bell is struck a number

of times, at slow intervals, which exactly resembles the ringing of a church bell for a funeral. Then there follows a squeaky sound from the train starter's bugle or whistle, whichever he happens to have. Following this the engine whistle blows and after that its bell rings and the train starts. No baggage checks are supplied so that owners of trunks have to be taken at their word when they point out those that belong to them and they are put to the necessity of keeping their eyes in the direction of the baggage cars to see that their belongings are not, by mistake, put off at the wrong station. Americans can be told by the shape of their hand luggage for the native "grip" is usually in about the shape of our ordinary trunks, but of course in miniature. A handle on the top serves them as a means of carrying the same. Soldiers are transported in cattle cars, and numerous such cars were passed bearing the words: "36-38 Hommes,—8 Chevaux." This means that each car has been made to carry from 36 to 38 men or 8 horses. At every road crossing there was always to be seen a woman waving a flag to warn drivers of the approaching train. These women are the widows or daughters of dead soldiers, this kind of job, as well as the selling of cigars and tobacco, being reserved for their benefit, by the government. It is in tobacco stores that postage stamps, postal cards, stationery, picture postal cards, magazines, newspapers, and railway guides have to be bought. Book stores carry some of these articles but, as a rule, the handiest place to get them is from the tobacco store. All through Normandy and Brittany apple orchards cover most of the farms. Other crops grow among the apple trees. Buckwheat is very common and grows much more rank and with much redder stalks than in America. Cider is the common drink of the people but the article supplied at hotel tables is far from tempting. It tastes more like an inferior quality of diluted vinegar than anything else. All

around each farm in Brittany, there are willow hedges. The willows appear to be used in making baskets and various articles of furniture. In Guyenne and Gascogne poplar trees gradually replace the willows as hedges. Both oxen and cows haul the farm carts and drag the plows. They are often seen hitched together. Most of the villages and country places in Brittany looked very strange to us, and the larger they were the more pronounced was their oddity. Instead of having small chimneys on the roof, as in our houses, the entire gable end of the house ascended, as a chimney, above the roof. Instead of slate or shingles, as coverings for the roof, some had red tiles, some thatch, and a large proportion of them slaty shale, in blocks about half an inch thick. Most of them had what appeared to be sashless panes of glass—single panes—fastened into the roofs. One of the most curious of all the curious sights, was the bread. It is a common thing to see women carrying to their homes, from some nearby bakery, loaves of bread fully two and a half feet long, one foot wide, and six inches thick. The crust on such bread is so hard that it tests the quality of the teeth and jaws of the users. Bakers supply many sizes, but purchasers appear to buy those that correspond with the number of consumers in the families. Whenever a funeral passes it is customary for all men to take off their hats and all women to cross themselves and say a prayer. In small towns this is not as noticeable as it is in large cities, like Nantes, Bordeaux, or Marseilles. There the streets are crowded, and when a great multitude simultaneously uncover their heads it is instantly observable. The mourning costumes of the women differ from those of America in the oddity of shape of the hats and the immense length, width, and foldings of the black sashes. The dresses can scarcely be seen, particularly from the rear, because of the size of the crape additions. Although flowers are

abundant, and much more beautiful than those supplied by florists in New York or Chicago, they decorate their tombs with painted metal imitations of flowers that, to me, look repulsive and unnatural. Most of the peasant women wear caps of immaculate whiteness, no matter what may happen to be the color of their other garments. The fronts of the caps are heavily fluted in white. Mourners use black fluting on the white caps.

The towns we visited were such as contained places of historic interest. Art, landscape, and architecture were of secondary importance. Rennes interested us as the early home of Descartes, Nantes as the place where Laennec, the invenor of the stethoscope, and Bichat had been students, La Rochelle as the place where Seignette first produced Rochelle salt, Bordeaux as the birth-place of Magendie, and Bayonne as where the bayonet was first produced. At La Rochelle we did not forget the wars of the Huguenots for freedom there, nor at Bordeaux did we lose sight of the fact that Benjamin Franklin landed at that port when on the most momentous mission of his life. We likewise recalled it was from there that Lafayette, at much risk, secured the ships he required to help America in its fight for freedom, and that near there is the present home of the exiled Acadians whom Longfellow's Evangeline has immortalized. At Bayonne who could forget that it was there where the two fiends, Catherine de Medici and the Duke of Alba, planned the horrors of St. Bartholomew's day? What a time of darkness and spot of moral blackness that day brought upon Paris! Medical science then came near losing one of its greatest sons. The chief object of Catherine's hate was Gaspard de Coligny, admiral of France, and a Huguenot. When the massacre occurred he was marked as the first to be sacrificed. They had even tried to kill him two days before, but only wounded him. The night of the massacre Ambrose Pare, one of the most important

individuals in the evolution of surgical science, was with him attending to his wounds. Pare was also a Huguenot Protestant. Coligny had long been aware of the intended massacre. To those present he said: "I have long been ready to die, but you, my friends, save yourselves, if it is still possible." As Pare still hesitated to leave his patient, the old admiral, urgently insisted upon his going. They heard the commotion and noise of the approaching crowd of murderers and the firing in the court-yard made them certain of what was about to happen. But for the intervention of Charles IX Ambrose Pare would still have met the fate of the other Huguenots of Paris, but the king had so much faith in his surgeon that he spared his life. He tried to force Pare to become a Catholic as a condition of saving his life, but the latter was stubborn and the former let him escape. The entire life of Pare is a most remarkable one. He, a mere barber, had, for many years to fight the whole medical profession. He took up surgery with his barber work, as was the habit of his time, and in order to advance himself in such work attended clinics at Hotel Dieu, Paris. Getting a position as surgeon-barber in the army he studied faithfully the methods then in vogue for the treatment of wounds. On one occasion the boiling oil gave out that it was the habit of the army surgeons, of those times, to use in every wound before bandaging it. He noticed that those whose wounds were not treated to boiling oil survived in far greater numbers than those on whom the oil was applied. When the surgeons were told of this they first made fun of him, and then denounced him as a quack and a fool. He persisted in fighting them and—naturally—those officers who happened to be wounded preferred Pare's method of treatment, as it was much less painful. His results told and he became the favorite surgeon of the army. His next great discovery was that of saving the lives of those with severed arteries, of large

calibre, by ligating them. This led to amputations of hopelessly wounded large limbs. To us, today, the opposition which he met from the profession, because of this discovery, seems like sheer insanity. He was denounced as being conceited for pretending to know more than all the rest of the profession. This, by the way, has always been a favorite missile to hurl at independent thinkers. It is not deemed conceit to fight the ignorance of one doctor, but it becomes serious conceit to fight the ignorance of all doctors. To all new knowledge there must be a beginning and much of it must conflict with tradition. One man must first observe this conflict. There may be many better posted and brighter men than he is, but their enthrallment blinds them to the new truth, and very frequently they are the blindest of the blind. Men who honestly desire truth either investigate the new claims or keep still. Bigots scoff, call names, denounce, and condemn. Honest criticism of a new idea is beneficial, but dogmatic condemnation is, by the ethical standard of nature, vicious and criminal. The worst foe of the human family is the man who dogmatically denounces even a genuine crank. If facts cannot prove his crankiness then no honest man is going to hurl invective at him and then refuse to give him an equal hearing. Ambrose Pare was a medical and a religious heretic, but we are now all ready to bless him for both phases of his heresy and then—well—some of us go ahead and imitate Catherine de Medici as far as we dare.

Paris—purged Paris—is far more liberal than she was. There are fewer of the stripe of that de Medici there now. Paris doctors, long steeped in senseless conservatism, have now a larger sprinkling of men who are not afraid of new thoughts whether true or false. They no longer drive their Vesalius's to Italy, nor give over their Servetus's to the stake. They have more men like Rene Descartes who, diplomatically, seek to promote truth without court-



601 PARIS (Place de Breteuil). — Monument élevé à la Mémoire de Pasteur  
par Souscription Internationale. — ND Phot.



ing martyrdom. He had the courage to defend Harvey, to teach evolution, to devote his life to the promotion of scientific physiology, and yet he was trained and raised as a Jesuit. His "cogito ergo sum," is still the despair of materialism—a pithy statement of fact that no opponent has ever been able to refute. He helped bridge the great chasm between past and present ways of thinking in both medicine and philosophy. His body, like that of Columbus, has been tossed about by the exigencies of politics, but the black marble tablet, in the church of St. Germain-des-pris, that marks his last resting-place, should be visited by medical tourists who hold in respect the great men who have helped create modern medical science.

There are a good many such spots in Paris. In the court of the Ecole de Medicine is a bronze statue in memory of Bichat that they should see. He was known as "The Napoleon of Medicine," and his "Anatomie general" laid the foundation stones of scientific pathology. He first differentiated and named the various tissues of the body, first taught us the meaning of respiration, first classified our organs in relation to their functions, and first taught us how to distinguish pleurisy, pneumonia and bronchitis from one another. A second monument to this great physician is found in the Pantheon, that stands on the site of the old tomb of St. Genevieve, the patron saint of Paris. There, too, are monuments to Descartes, the physiologist and philosopher; to Lafayette, who did so much for the United States; to Laplace, the astronomer and evolutionist; to Berthelot, the chemist; and to many other of France's great sons. In the Rue des Ecoles, facing the College of France, can be found a bronze statue to the memory of Claude Bernard, the man who, along with Brown-Sequard, taught us the function of the thyroid gland and who discovered the glycogenic function of the liver. He was the assistant and successor of another French-

man, Magendie, Professor of General Pathology in the College of France. The name of Magendie is familiar to most physicians through his solution of morphine, but he owes his reputation for greatness to much more than this. He was the pioneer experimenter in pharmacodynamics, and to him we owe the use of the alkalies as therapeutic agents. He too first coined the words "pyemia" and "metastasis" as terms of pathology. On the Chemin du Dragon, in the Cemetery of Pere-La-Chaise—the principal cemetery of Paris—can be found the tomb and handsome medallion that marks the last resting-place of Geoffery St. Hilaire, the great naturalist, and Member of the Academy. Around where he lies are hundreds of tombs of great painters, authors, sculptors and statesmen, but none of them ever did as much for the advancement of man as he did. As a link in the chain of mental progress he made Darwin possible and even anticipated the mutation theory of De Vries. His "Philosophie Anatomique" was greatly admired by Goethe because of its evolutionary ideas. He was the colleague of the famous Lamarck whose theory of evolution by acquired characters is today one of the burning questions of biology. Both St. Hilaire and Lamarck studied medicine but turned their attentions to science, and both were so unfortunate as to spend the last days of their lives in blindness. Both held positions in the Jardin des Plantes, one of the most interesting spots in Paris for a stranger to visit. To Lamarck we are indebted for the word "biology" as applied to the science of living things. Competent authors speak of him as the most prominent figure between Aristotle and Darwin. While this may apply to Lamarck as a naturalist, when viewed by naturalists, he can occupy no such position from the standpoint of medicine. If we pass Darwin and come a few years nearer to our own time, the one man who looms up above all others and who, in some respects matches even

Darwin, is Louis Pasteur. He revolutionized medicine as no man ever did before him. The Pasteur Institute, as a monument to his memory, and the international subscription monument, at the Place de Breteuil, are evidences of the impression he has made on this generation, but it is the firm conviction of this writer that a century from now he will be revered even more than he is today. Without his work we never could have discovered the etiology of disease as we know it now. To the masses he is known as the man who taught us how to overcome rabies, but to the well posted physician he is the man who taught us how to know the causes of all kinds of diseases and who put us on the path that is leading us into the knowledge of how to cure diseases. Aided by Davaine's discovery of the anthrax bacillus, Chaveau's discovery of artificial immunity, and Calmette and Roux's many discoveries concerning the mechanism of immunity, Pasteur, and the Pasteur Institute, have done more for suffering humanity than is generally known. Much—very much—has been done in Germany, but that is another story.

Nor has the good work of the Pasteur Institute come to an end. It is still going on under the leadership of another great discoverer, Metchnikoff. His chief discovery, however, and one that will be remembered for all time, is the phagocytic function of the leucocytes. On this discovery hangs the true explanation of acquired immunity. It reveals the fact that our cells fight disease in almost exactly the same way as our stomachs or duodenums digest our food. Indeed, by inference, it seems to indicate that digestion is as much of a protective measure as it is a means of nutrition. The existence of these fighting cells shows us that the struggle for existence and the survival of the fit began with monocellular life, kept up through the lowest forms of polycellular life, and has never, to this day, ceased.

The great battle for existence at all

times has been within, rather than without, the animal's body. The forms that have survived must have chiefly been the forms that were able to meet and defeat the invisible, more often than the visible foes. Metchnikoff made his great discovery at the ill-fated city of Messina, in Sicily. When this series of papers was begun, the reader will recall that we started from Catania, a city within a few miles of Messina, and that we had just arrived there from Messina. It was in the waters between Messina and Catania that Metchnikoff secured his research material that led him to the discovery of phagocytosis. So novel was this idea of fighting cells that there was no particular inherited theory to oppose against it. One would hardly have expected it to be vigorously opposed unless facts were really against it. The conservative habit of fighting everything new, merely because it is new, is so strong a trait among some men that, without waiting for facts, it was at once assailed, and by the very men who should have been the first to espouse it. Prof. Ziegler and his pupils went against it with all their might in spite of the fact that it was from Ziegler's book that Metchnikoff got most of the facts which he used in strengthening his own interpretation of the things he had observed. It was not long, however, before many other observers saw the things that Metchnikoff was the first to see and he was thoroughly vindicated.



## BRITANNIA.

Much of what Greece was to the development of ancient medicine Britain is to modern medicine. Were it not for the fact that to Germany we chiefly owe the careful, accurate working out of the data of cytology and pathology Britain's pre-eminence would be undeniable. As it is we owe to the latter the elucidation of the great principles of that biology which includes, as part of itself, Germany's contributions to cytology and pathology. The temple of modern medical truth has been built from the plans of British architects, but the hard work of its construction has been done mostly in Germany, though a large part of it must be credited to France, Holland, Italy, Russia, Switzerland, the United States, and Scandinavia.

In constructing an itinerary of travel through the British Isles the medical tourist who desires to bring himself in touch with the historical associations through which these plans evolved should on no consideration fail to visit Edinburgh, Cambridge, and Oxford. All of these should be triple-starred. In order to give them a fit perspective he ought to see the places where Christianity first took root in this same part of the world. By landing at Queenstown, as this author did in a tour that preceded his peritropical one, the traveller will be suddenly introduced to that part of Ireland where the "brogue" is the thickest and Hibernian ways most pronounced. He will see the place from which Wm. Penn sailed for America, hear the celebrated "Sweet Bells of Shandon;" have his first ride in a "jaunting car" to Castle Blarney and get a

chance to kiss the Blarney Stone, enjoy the justly celebrated beauty of the Lakes of Killarney, visit Dublin the modern capital of Ireland, and cross the "Boyne Water" where William of Orange defeated King James of Scotland, much to the satisfaction of the Scottish people. Soon after passing the Mourne Mountains he can stop and study the ancient capital of Ireland and stand upon the spot where the first Christian church was erected in the British Isles. Here in the ancient Dunun of Ptolemy most probably lies all that is left of the body of Saint Patrick. The place now bears the name of Downpatrick. The cathedral stands upon a hill within the town and probably occupies the site of the chapel which Ireland's saint dedicated in A.D. 432. This was about the time the Angles and Saxons invaded Albion, and later caused its name to become England. On the east window of the cathedral is an inscription in Latin which reads: "Hi in tres Duno tumulto tumulantur in uno, Brigdia, Patricius, atque Columba pius." This has been translated so as to read: "Three saints do rest upon this holy hill, St. Patrick, Bridget and St. Columbkil." Before the advent of railways the people of this region had not given up ancient methods of treatment. About a mile from the cathedral are four shallow wells that have been long known as the Wells of Struel. They have likewise been known as the Wells of Saint Patrick. For ages they have singly been known as (1) the "Body Well" or well in which acute bodily infirmities could be cured and sins removed; (2) the "Limb Well," or well in which diseased arms and legs could be healed; (3) the "Eye Well," or well in which diseases of the eyes could be subdued; (4) the "Well of Life," or well in which chronic bodily ailments could be overcome and perfect health restored. Some years ago a Protestant bought the property on which these wells are situated and instead of pursuing the American plan of making money out of credulity he has been discouraging such

superstition by making visitors a laughing-stock for himself and friends. At one time scarcely a day would pass without dozens of pious visitors being present crawling and praying in these wells. Now the occasional visitor finds a non-congenial atmosphere to freeze his faith, so that the reputation of this Irish Epidaurus is almost at an end.

By crossing Ulster, to the County Donegal, the tourist can reach the Garton Lake and visit the birth-place of St. Columbkille. Here was established the second head centre of early Christian religion. About A. D. 450 St. Patrick and St. Columbkille dedicated a chapel on a hill not far from the lake. What is claimed to be the ruin of that chapel is still standing there. Possibly the stones and the spot may be the same, but it is quite evident that even that roofless, doorless, windowless old ruin is too modern for such a claim. Anyway the people of the region are convinced of its being the original. A broken stone font lies near the remnants of an altar. Some one, as an act of devotion, seems to keep it supplied with water, and if appearances do not belie facts that altar and that water must be often used. All around these, stuck into the plasterless walls, hung on extemporized wooden pegs, placed on projecting stone ledges, and strung on suspended cords, are myriads of mementoes of the suffering and ailing. There are small crosses by the hundreds, prayer beads a basketful, scapularies by the score, rags, handkerchiefs, rings, brooches and pieces of various kinds of garments in great abundance. On one small ledge I counted more than fifty strings of prayer beads. All these are left for the devouring maw of time to eat up along with the weather worn, roofless chapel that constitutes their store-house. There is no officiating priest, no fees and but few obtruding travellers. It is so far from the currents of civilization that it stands as a well preserved vestige of premedical times.

A few miles farther on and we found



Dooan Holy Well, with a number of ailing persons drinking its water and praying on its brink. Thousands, we were told, visit it every year. All around the well are abandoned crutches, canes, and branches of shrubbery that are hung over, from top to bottom, with handkerchiefs, rags of many kinds and colors, strings of prayer beads, small metal crosses and other articles that have been made to touch the ailing at affected points and left here with a prayer after gorging with the water. As far as the eye can see there is scarcely a tree, bush, or shrub that is not decorated with such articles. In a near-by hut the tourist can buy picture postal cards of this gruesome and painfully suggestive sight. The driver of our jaunting car assured us in a most emphatic manner of the great efficacy of such treatment. He had never known of a sufferer who did not get relief unless "mortally affected." The same driver believed just as thoroughly in the existence of "wee folks," as he called the "fairies." Hindoos carry home the sacred water of the Ganges to purify their souls and renovate their sick bodies and the devout people of Donegal carry home thousands of bottles filled with Dooan water for the same purposes. This vestige of primitive simplicity, not far from the heart of modern civilization, is at once interesting and astonishing.

The third head-centre of early British Christianity is in Scotland. Before reaching it the sight-seeking tourist will visit the intervening places of historic, scenic, and scientific interest. A few miles from Garton Lake is McSwine's Gun, on the tip of land that is first seen by transatlantic travellers between New York and Glasgow. This is a cavern, with a small opening at its summit, into the mouth of which sweeps the Atlantic surf. In high winds so much water enters that it compresses the air in a manner that makes it escape from the upper opening with a roar like that of a cannon. At Londonderry the cathedral occupies the

site of another ancient chapel of St. Columbkille. This curiously walled old city stood a siege of nine months, in 1688, under the governorship of a Presbyterian minister. Those were the days when men had to fight for "life, liberty, and the pursuit of happiness," and the tales of their sufferings are most pathetic.

At the Giant's Causeway the traveller sees one of nature's greatest wonders. There nature looks as if attempting to mimic man. Acres of basaltic columns have all the appearance of having been chiselled into form by skilled stone cutters and fitted into position by trained masons. On the way to the Causeway from Portrush the tourist is carried upon the first electric railway line ever constructed on a commercial scale on our earth. From the Causeway, as he proceeds toward Larne he sees and may, if he chooses, cross on the Carrick-a-Rede swinging rope bridge that spans a chasm over the boiling surf of the Irish Sea, a hundred feet below, to a small island near the mainland. On the same route he can visit the Falls of Glengariff, the grave of Ossian, and the strangely sea-carved basaltic rocks known as "The Gobbins." On the way he passes through miles of gorse and heather-covered bog, resplendent in the beauty of solid masses of bright pink and golden yellow blossoms.

Crossing to Scotland, by way of Stranraer, he passes through the romantic country made famous by Burns' poems, visits, if he chooses, the many places described in these poems, takes a look at Loudon Castle where the representatives of the kingdoms of England and Scotland signed the agreement that gave birth to the British Empire, and then proceeds on his way to Greenock and Glasgow. On the Clyde River he sees miles of ship-yards in which are being built hundreds of monster ships destined to constitute the future navies and merchant vessels of every country in the world. Proceeding to the world-renowned Trossacks he sees in turn the home of Rob Roy



Ellen's Isle, and the scene of the conflict between Fitz James and Rhoderic Dhu, all so beautifully described by Sir Walter Scott. On reaching Oban he takes a steamer for Iona, by way of Staffa. At Staffa he sees Fingal's Cave the only large cave of its kind in all the earth. Like the Giant's Causeway it is a mimicry of human effort, but on a colossal and, therefore, unhuman scale. It is one of the greatest natural wonders of our planet. Far into the mass of the apparently chiselled columns the surging sea has cut its way and left a cavern with fluted sides like some immense cathedral. Staffa and Iona belong to the Hebrides Islands, and are therefore part of the Ultima Thule of the ancient world. They are but a few miles apart. Iona was for ages known as "The Holy Isle" to all of Europe. To it came the sick and the sinful from remote regions to gain the consolations of religion and get cured of their ailments. Of it so great an author as Dr. Johnson wrote that, "That man is little to be envied whose patriotism would not gain force upon the plain of Marathon, or whose piety would not grow warmer among the ruins of Iona." Liberty for all the earth was at stake on the plain of Marathon and the struggling plant of early Christian faith flourished on this little island while it kept dying at every other place where planted in all the country around. The inspiration from Marathon and that from Iona has been of incalculable value to our race. Crude as we may now deem the methods of treating the sick formerly practiced in Iona, it was the purest and best upon the earth at that early epoch. So greatly beloved did the spot become that it became the chosen burial place for kings. Even Macbeth chose its sacred soil in hopes of being forgiven by murdered King Duncan, whose ashes rest near to his own.

From Iona to Edinburgh carries us from ancient to modern medicine, and from ancient to modern philosophic thought. In

journeying from one to the other the student of Scottish history will desire to stop on the way and see Stirling Castle and the field of Bannockburn. Burns has immortalized the latter in his "Scotts wha hae wi' Wallace bled." On reaching Edinburgh—the Athens of Great Britain—its beautiful situation immediately captivates the heart. Sir David Wilkie, viewing it for the first time and critically studying it as an expert artist, wrote to his friends that "What the tour of Europe was necessary to see elsewhere, I now find congregated in this one city. Here are alike the beauties of Prague and of Salisbury; here are the romantic sights of Orvietto and of Tivoli; and here is all the magnificence of the admired bays of Genoa and of Naples. Here, indeed, to the poetic fancy may be found realized the Roman Capital and the Grecian Acropolis." But great as are its scenic beauties greater still are its romantic attractions when standing in "The Heart of Midlothian" and viewing it through the poetic eyes of Sir Walter Scott. But our study now is neither scenic nor romantic but medical. What of the additions which "Auld Reekie" has made to medical science? During two centuries the following stars of the first magnitude have, directly or indirectly, been closely attached to its university. Some of them were born there, some studied there, some graduated there and two of them received honorary degrees from there. Who among the readers of the Medical Fortnightly have failed to become familiar with the names of such world-wide celebrities as Drs. Hunter, Priestly, Black, Hutton, Darwin, Dalton, Brown, Young, Bell, Bright, Duncan, Owen, Lister, and Huxley? What educated man in all the world has failed to become familiar with the names of Robert Chambers and Charles Darwin, neither of whom became doctors? William Hunter, "the first great teacher of anatomy in England," was born in Lanarkshire, near Glasgow, but spent two years at Edinburgh, taking his degree there. In

his school of anatomy in London he had among other illustrious pupils Edward Jenner, the discoverer of vaccination. Jenner made his home with Hunter, while in London, so that their tie of friendship was closer than that of teacher and pupil. John Hunter, William's youngest brother, who was also born in Scotland, received his anatomical knowledge from the latter. He became even more celebrated than William. The British Encyclopedia tells us that he is "as physiologist and surgeon combined unrivalled in the annals of medicine." He was the first person in this world to ligate a large artery for aneurism. His studies in comparative anatomy made him the precursor of Cuvier. His anatomical museum is now the property of the Royal College of Surgeons, London. The Hunter Society of Edinburgh, started in honor of him, is one of the most important societies for the advancement of comparative medical science in Great Britain. Joseph Priestly, the second in the galaxy of Edinburgh stars that is here named, is the discoverer of oxygen. He was a Birmingham man, but received the honorary degree of LL. D. from Edinburgh. He was so persecuted for religion's sake, in Birmingham, that he fled to America and ended his days in this country. The writer of this has always had a sympathetic feeling for Priestly, because he once wrote, "I saw reason to embrace what is generally called the heterodox side of almost every question." Today there stands in front of the town hall of Birmingham a large statute to the honor of this man whose home was there destroyed by a mob and he compelled to fly his country because he refused to have his intellect cut to the standard of bigots. While reading the inscription on that monument, with bared head and reverent heart, I asked myself whether the time would ever come when bigots would know themselves to be bigots and quit seeking to coerce others who are usually their mental superiors. The third great name on our list is that of Joseph Black

whose graduating thesis, written in 1752, when he was only 24 years of age, wrought a complete revolution in scientific methods. In his experiments he used a balance, and thus secured exact results. He thus laid the foundation of modern chemistry so that even Levoisier credited him with precedence. John Hutton was born in Edinburgh, but took his medical degree in Leyden. As a pioneer in geology he paved the way for Lyell. Erasmus Darwin received his M. D. in Edinburgh but returned to England to practice. As a poet and philosopher he ranked high, and his theory of evolution paved the way for that of Natural Selection, as propounded by his illustrious grandson, Charles Robert Darwin, author of the "Origin of Species." His son, the father of Charles, was also an M.D. of Edinburgh. In his description of the evolution of the human hand, through an accidental variation in the muscles, Erasmus Darwin almost anticipated the doctrine of Natural Selection. His ideas were afterwards parodied thus:

"There was an ape in days that were earlier;  
Centuries passed and his hair became curlier;  
Centuries more and his thumb gave a twist,  
And he was a man and a positivist."

John Dalton, the propounder of the atomic theory of matter, was a Manchester man, but he received from Edinburgh the honorary degree of LL.D. The basis of his theory was the definite and reciprocal proportions in the unions of chemical substances. These could not have been discovered except by the method that Black had established. Robert Brown received his medical degree at Edinburgh. He laid the foundation on which Schwann and Nageli at a later date strengthened the cell theory of life, by discovering the nucleus in plant cells. Thomas Young, discoverer of how to read the Egyptian hieroglyphics and propounder of the undulatory theory of light, studied medicine at Edinburgh, but took his M.D. degree at Cambridge. Chas. Bell, the great physiologist and surgeon, taught surgery in Edinburgh. He was the

first person who distinguished the difference between motor and sensory nerves. As editor of Paley's *Evidences of Christianity*" he was indirectly connected with directing Darwin's mind toward the doctrine of Natural Selection. He was the first head of the new medical school which later became University College, London. Richard Bright, who first pointed out the relationship between dropsy and kidney disease, and for whom the latter has received the name of Bright's disease, was a graduate of Edinburgh University studying there under Dugald Stewart, Playfair, and Leslie, men almost as renowned as the ones we have named. Dr. Duncan, the man who isolated the first active medicinal principles of any plant, received his degree from Edinburgh, and was in Edinburgh when he accomplished this important work. The alkaloids thus isolated were those of cinchona. He did not however, separate the quinine from the cinchonine and other alkaloids. This was done at a later date in France. Richard Owen, the leading comparative anatomist of the nineteenth century, the founder of the Hunterian Society, and the man who first made the important distinction between analogy and homology in anatomy was a graduate of Edinburgh University. Lord Lister, founder of antiseptic surgery and the prophet of cleanliness in surgical and gynecological work, was Professor of Clinical Surgery in Edinburgh University, and did his first surgical work in Edinburgh Royal Infirmary. One has only to read the records of the deaths from surgical pyemia and puerperal septicemia before the days of Lister in order to appreciate the vastness of the reformation he brought about. Thomas Henry Huxley, the St. Paul of Natural Selection, received his M.D. degree at Charing Cross Hospital, London, but Edinburgh honored him with the degree of LL.D. He was the founder of Scientific Paleontology. Robert Chambers, of the *Encyclopedia of Useful Knowledge* and reputed author of the anonymous *Vestiges*



of Creation," spent most of his days in Edinburgh. He was a self-taught man but an extensive writer, and no one ever did more toward popularizing scientific knowledge of every kind. The "Vestiges" was the despair of theologians. The more they condemned it the more editions of it had to be printed in order to supply the unprecedented demand. It is not likely that Darwin's *Origin of Species* would have leaped into the almost immediate recognition among biologists that it did had it not been preceded by Chamber's less scientific volume. It made the subject of evolution a burning one of that generation, and the biologists were called upon to refute it. Like Balaam they were asked to curse but, like Balaam, they were compelled to bless. Not suspecting Chambers as being the author of such a book strictly orthodox St. Andrews, the oldest University in Scotland, gave him the honorary degree of LL.D. for the well-known educational work that he was engaged in.

In the long list of great names of the men who have made Edinburgh famous none stands so high as that of Charles Robert Darwin, the immortal author of "The Origin of Species." Following the footsteps of his father and grandfather, he entered college there intending to graduate in Scotland, but fate ordered otherwise. He left Edinburgh, went to Cambridge and took his degree of A.B. at Christ's College, the alma mater of the author of *Paradise Lost*, John Milton. After graduating, his voyage as a naturalist on H.M.S. *Beagle*, his studies of Lyell's *Geology*, his reading of Paley's works on *Natural Theology*, and his interest in the contents of Malthus' book on the *Laws of Population*, directed his mind to *Natural Selection* as the only reasonable explanation of nature's remarkable adaptations. This law is so deeply concerned in the production of all living things that now our eyes are being opened to its vast importance in physiology, pathology, bacteriology, protozoology, pre-

ventive medicine, therapeutics and in fact every conceivable part of modern medical science. By following its indications we are discovering serums, glandular extracts, opsonins, precipitins, and hormones and learning something of how and why drugs act upon diseases. It only is able to give us the slightest idea of the meaning of phagocytosis, of bacteriolysis, and of hemolysis. As we begin to appreciate the overwhelming importance of Darwin's theory to coming medical science we become sorry that he failed to follow in the footsteps of his father and grandfather by himself taking the medical degree even if he failed to become a medical man. He was born and reared in a medical atmosphere, and even the mother who bore and nursed him has her maiden name in everyday use in every drug store in the world. She was the daughter of the famous Wedgewood the first producer of the Wedgewood mortars with which our powders and pills are mixed, and in which our crude drugs are comminuted. But let us now follow him to the banks of the river Cam and take a look at the great university where he graduated.

After "doing" Edinburgh few will want to leave Scotland without seeing Abbotsford, the home of Sir Walter Scott. From there a most interesting route to take is that which leads to Melrose Abbey, Peebles, Lockerbie, Gretna Green, and Carlisle. This carries the tourist past the Esk River of Lord Lochinvar, the birthplace of Thomas Carlisle, the spot so long celebrated for runaway weddings, and lands him in the lake country of Northern England—the home of Wordsworth,

"Where Derwent rests and listens to the roar,  
That stuns the tremulous cliffs of high Lodore,"

There he can sit and recite Southey's "Why does the water come down at Lodore" as he watches it "eddying and whisking, spouting and frisking, turning and twisting around and around." After taking the

ride from Keswick to Buttermere, that is declared to be the "finest drive in the kingdom," Manchester, Eccles, Sheffield, Castleton, Chatsworth, Derby, Newstead Abbey, and Grantham should next be seen by those seeking interest and instruction. From Manchester to Eccles will be crossed the first piece of railway ever constructed on this earth, and at Eccles station will be seen the first spot on the earth where a human being was mangled by a locomotive—the never to be forgotten "Rocket" of George Stephenson. At Castleton will be seen the abode of "Peveril of the Peak," of Scott. At Chatsworth and Haddon Hall, England's finest home and Dorothy Vernon', interesting romance can be studied together. At Derby, the birth-place of Herbert Spencer and the home of Darwin's grandfathers where he practiced medicine, are but a few doors apart. At Newstead Abbey is the birth-place of the poet Byron, and near by is the Sherwood Forest of Robin Hood. At Grantham will be seen the birth-place and early home of Sir Isaac Newton. Every one of the places named has many interesting sights that cannot be referred to in this brief sketch. From Grantham to Cambridge is but a short ride, and even it is punctuated with romance and pathetic history at several places. On landing at Cambridge we are at once attracted by the beauty of its lawns, gardens, trees, and buildings. It lacks the natural glory of sea and hill possessed by Edinburgh, but man's efforts have done much to overcome this defect. Taken as a whole it is a pretty place and well worth seeing for itself. Taken in connection with its historical associations no educated person can say that he has seen England who has failed to see Cambridge.

Trinity College—but one of its nineteen colleges—has given to the world such scholarly men as Bentley, Whewell, Newton, Bacon, Dryden, Cowley, Herbert, Macauley, Byron, Thackeray, and Tennyson. These are men for any nation to be proud of. Cambridge

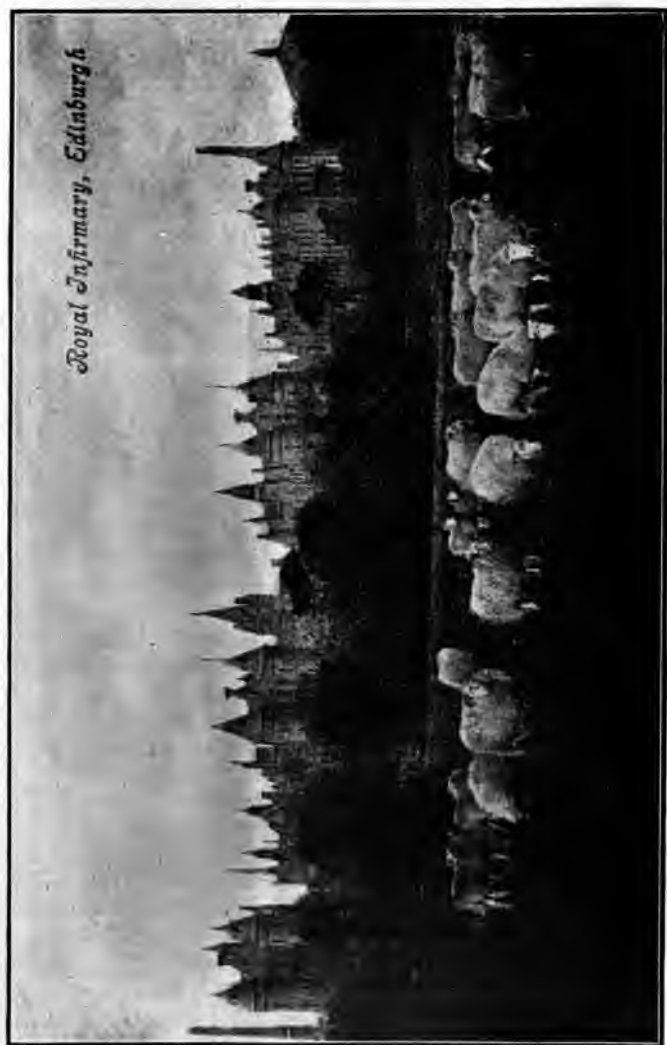
divides honors with Edinburgh in giving us the Darwins and Dr. Thomas Young. It divides honors with Padua in giving us William Harvey, the discoverer of the circulation of the blood. Harvey was born at Folkstone, near Dover, a place that all should see who travel between France and England by any of the usual routes. He had his early education in Canterbury, another place that none should miss seeing if only because of its magnificent and historic cathedral. But it was in Canterbury that Thomas Linacre, the founder of the College of Physicians of London, was born. He first placed the education of medical men upon a legal basis in English speaking countries. The charter of his college is the model of the charters of all subsequent purely medical and surgical colleges. As physician to Henry VIII, and later to Mary, his influence was great so that he was able to suppress ignorance among medical practitioners, as no one had been able to do before him. He founded a chair of medicine at Cambridge and another at Oxford, thus linking his name with all of the great educational centers of his time. His successor as royal physician to Queen Mary, Dr. John Caius (pronounced Keys), erected a monument in St. Paul's Cathedral to Dr. Linacre and imitated Linacre by chartering and endowing Caius (Keys) College, Cambridge. This is known as "the medical college" of Cambridge. The third of its three famous gates—the Gate of Humility, the Gate of Virtue, and the Gate of Honor—has been praised by the great architect Fergusson as a beautiful example of early renaissance in England. In imitation of Caius and Linacre, John Harvard, another of old Cambridge's great graduates, founded our Harvard University, at Cambridge, Massachusetts. About a century after the time of Caius, Dr. John Ray and Dr. Robert Hooke graduated at the English Cambridge. The first named was the forerunner of Linneus in botany and of Paley in natural theology, thus

starting thought along two of the lines which led to Darwinism. He first defined a species as the word has since been generally understood. Robert Hooke, in his "Micrographia," gave the first picture and description of the cell structure of plants. He was the pioneer student of the cell theory of life. To him we are indebted for the balance springs in watches, and he almost anticipated Newton's theory of gravity. Malthus, "the scientific expounder of the principles of population," graduated at Jesus College, Cambridge. From him, as we have already seen, came the germ idea that led Darwin's mind to the doctrine of Natural Selection. What Malthus was to Darwin Francis M. Balfour, another graduate of Cambridge, and pupil of the well-known physiologist Foster, was to Ernest Haeckel and Fritz Mueller. His "Comparative Embryology" guided Mueller to his recapitulation theory and made possible Haeckel's "Evolution of Man."

As the Darwins linked Edinburgh with Cambridge so Dr. Thomas Sydenham, "the English Hippocrates," linked Cambridge with Oxford. He graduated as Bachelor of Medicine at All Soul's College, Oxford, and as Doctor of Medicine at Pembroke Hall, Cambridge. He saved regular medicine from disgrace by defending the use of cinchona; he started the use of tincture of opium; he was the first to diagnose scarlet fever and the first to identify chorea; he first taught that disease is a conservative effort on the part of nature to overcome some evil cause that he could not fully understand; he fed fevers, and he first advocated the "let alone" doctrine in all cases not properly understood. He was a terror and a crank in the eyes of many of his medical contemporaries, because he in numerous ways anticipated twentieth century medicine, over two hundred years in advance of his age.

The trip from Cambridge to Oxford carries the tourist over a little more than sixty miles of interesting country. Na-

*Royal Infirmary, Edinburgh.*



thaniel Hawthorne wrote that "The world, surely, has not another place like Oxford; it is a despair to see such a place and ever to have to leave it, for it would take a lifetime and more than one, to comprehend and enjoy it satisfactorily." In it there are twenty one colleges, from each of which has graduated many eminent men. Reference has already been made to two of its greatest graduates—Jenner of vaccination fame and Lyell the geologist. The latter led the way to Darwin's *Origin of Species* by showing the earth's record of progressive development. Darwin's keenest interest centered on this Scotch savan when trying to convince the world of the truth of Natural Selection. Lyell, Huxley, Hooker and the American botanist, Asa Gray, were the four men whom his heart was set upon as the most important converts to make, and he converted them all. Other forerunners of Darwin, on the philosophical side, were Locke and Berkley. They were both Oxford men. Along with Hume, of Edinburgh, they constitute a trinity of reasoners that stirred up human thought to its very depths and "paved the way for Herbert Spencer's all-embracing Synthetic Philosophy. Among the medical professors of Oxford, whose studies had much to do with this maelstrom of thought, were Drs. Francis Glisson and Thomas Willis. In Glisson's capsule and in the Circle of Willis we have constant reminders of these two men. Glisson's doctrine of the irritability of protoplasm and Willis's work of cerebral localization constitute large blocks in that temple of truth that has culminated in Darwinism. By going back to the crusades we find that Richard the Lion-Hearted was born at Oxford, and he, next to Barbarossa, was the most important figure of those turbulent times. While theological feuds added little directly to the evolution of medicine as indirect influences they were of some importance. Oxford had a large share of these. The Martyrs' Memorial, to the memory of Cranmer, Latimer

and Ridley who were burned as heretics in front of Baliol College, attests to this. In calmer and saner times the Wesleys and Pusey were products of Oxford. The following are the names of a few important personages of world-wide reputations who have graduated at Oxford: Montgomery the poet, Bishop Heber the author of "From Greenland's Icy Mountains," Blackstone the great lawyer, Johnson the lexicographer Shirley the poet, Hamilton the metaphysician, Froude the historian, Shelley the poet, Charles Reade and Wilkie Collins the authors, Gibbon the historian, Frederic Harrison the positivist, Sir Christopher Wren the architect, Sir Walter Raleigh of tobacco fame, Fox of the "Book of Martyrs," Barham of "Ingoldsby Legends," Arnold of "Tom Brown's School Days," the Duke of Wellington, England's great soldier, Peel and Gladstone England's great statesmen, General Oglethorpe founder of our State of Georgia, and Oliver Cromwell of the Commonwealth. The Royal Society of Great Britain grew out of scientific meetings started in Oxford in 1648. As I hasten to close the Oxford record the names of Brice and Ruskin come to my recollection as men not to be forgotten among the graduates of that place.

From Oxford to London would be the next logical step in a narrative of this kind. Other interests than medical, however, would attract the tourist to the celebrated and nearby Blenheim Castle that came to the Duke of Marlborough for that "famous victory" that old Caspar told about; to Banbury Cross where legend tells about an old lady on a white horse who had rings on her fingers and bells on her toes; to Stratford on Avon the home of Shakespeare; to Kenilworth Castle with its Walter Scott romance; to Rugby the home of "Tom Brown;" to Coventry of Lady Godiva fame; and to Birmingham that supplies all the world with more kinds of goods than any other half dozen cities on earth. After seeing these one can turn with satisfaction



in the direction of the metropolis of Britain, and, practically, the metropolis of the globe. A sail down the Thames should not be omitted. Windsor Castle, in the grounds of which Harvey made the earliest scientific researches on embryology; Eaton and its colleges; Stoke Pogus cemetery where Gray the poet is buried, and where he is believed to have written his "Elegy;" and Kew Gardens—the most interesting botanic gardens in Europe—can be taken on the way. As the text of this article has already made many references to London, its medical colleges and their graduates, the task has been lightened for the closing of this article. But there are still many important names that have not been mentioned that must not be overlooked. There are Addison and Hodgkin of Guy's Hospital, whose names are household words to every physician, and that cannot be forgotten because of Addison's disease and Hodgkin's disease. To Addison we must trace our first knowledge of the importance of ductless glands. The Royal Society gave us Davy, Farady, and Tyndall, three immortal names of self-made men. Cambridge gave Tyndall the honorary degree of LL.D. Davy and Farady advanced medical science through their chemical discoveries while Tyndall's great service was that of making the work of Lister possible. His evidences of germs in the air and his method of intermittent sterilization by heat were discoveries of incalculable value to life and health. Along with Huxley, who was an M.D. of Charing Cross, the fight for Pasteur and Darwin was conducted. Both were loyal to truth when such loyalty was really needed. Cowardice is a common trait of our race when new doctrines have to be defended against bitter prejudice, but neither Huxley nor Tyndall were cowards. They fought like heroes and they won like giants. Within the walls of Westminster Abbey these and others of the great men here enumerated have been honored by tablets and monuments, which every visitor to London

should see. To the disgrace of that Hall of Fame, Herbert Spencer has been excluded. The false notion that manual dexterity for science is superior to mental prowess in the same noble task is responsible for this. When the method of Zadig is vindicated, as so beautifully portrayed by Huxley, and when the Magi have been conquered by their enemy—common sense—Spencer will have a niche there along with Charles Robert Darwin.





## SCANDIA TO GALLIA CISALPINA.

In previous letters concerning "The Lands Where Medical Science Evolved," all descriptions have been of places visited during my peri-terrestrial tour. To have closed the series with only what was seen during that journey would have left the story very incomplete. Germany and its neighboring countries were not included in that itinerary, yet they have added enormously to the later phases of medical development. On this account it has been deemed advisable to include them in this separate chapter. A previous tour made by Mrs. Eccles and the author supplied the material with which to complete the record and bring it down to our own day. We had become wearied of spending our holidays seeing American sights and determined upon a change. "The Land of the Midnight Sun" appealed to our curiosity as a proper region to see and securing a state-room on the Steamship Etruria of the Cunard Line, we proceeded to Great Britain. Having spent some days in the British Isles we made our way to Newcastle-on-Tyne where we found the Norwegian cruising ship Vega on which we had 'booked' passage before leaving New York. The accommodations were excellent, and had we not happened to have an exceedingly windy passage across to Bergen everything would have been most agreeable. Byron tells us that,

"There's not a sea that traveller e'er pukes in.  
Turns up more dangerous breakers than the Euxine."

His experience and ours do not seem to have been alike. During our visit to Turkey we found the Euxine calm and peace-

ful near where it enters the Bosphorus. Had he been with us on the German Ocean he might have had a different notion. Its foam-crested, boiling, surging billows beat everything in our experience. We frequently thought of the school-book poem about the Norse sailor to whom such tempests are "only a thing of laughter," and wondered if any of them would love this one "better than sleep." Our seamen certainly did not seem to have any such affection for it, as they, like the passengers, failed to appear at the tables during meal hours. The wind fairly screamed through the rigging. The Vega tossed, tilted, waltzed, and staggered like a toper. Suddenly she would sink away from beneath our feet and then, just as suddenly she would go up with a jerk that reminded us of a catapult. The screw propeller, now in water, then in air, and again divided between the two would shake and jar the timbers of the vessel as if about to tear them asunder. Great waves inundated the decks every few minutes, and as far as the daring eye ventured to look across the deep it had the appearance of a solid mass of soap foam. We had thirty-odd hours of this to endure before reaching the placid waters between the coast islands and the mainland. When the "Oh!—My!" feeling was about at the verge of uncontrolability, despite the prostrate position, a knocking at our state-room door and a cry of, "Come quickly, doctor, a woman passenger is dying!" started me up with a jerk. "How the deuce do they know that I am a doctor?" I asked my wife., "The purser must have seen that you were addressed as doctor, on the letters he had for you when we came on board," she replied. This proved to be the case. The ship had no physician of its own on board, and it became my duty to try the impossible task of curing an ailment in others that baffled my skill to thoroughly subdue in myself. The moral every medical reader, who expects to go a-touring, should take home to himself.

As soon as we passed the island barrier and began skirting the coast the sailing became heavenly. If, instead of trying to save time by taking this short-cut across that tempestuous sea we had gone around, via France and Denmark, to Bergen it would have been impossible to have conceived of a voyage of greater comfort, more bewildering beauty of landscape or more thorough enjoyment than that one proved to be. Many doctor friends have followed us on that route since, and all have declared that it is unsurpassable in everything that an ideal tour should be. Days extend into weeks of calm enjoyment. The sea along the coast is as smooth as a river. The sky, in July that year, was as clear as that of Italy, except at North Cape. There the Arctic Ocean brings very frequent clouds. The fjords are indescribably beautiful. No photograph, or even cinematograph, can do them justice. In any picture that can be made but one side can be seen at a time. They lose the sense of all-roundness which the real scene produces in us. The frequent rides behind Norwegian ponies, on what the Norwegians call Stolkjars, break any possible monotony that might arise. These are taken overland, from fjord to fjord, the ship, in the meantime going ahead to meet the passengers at the next fjords after leaving them in the deepest recesses of one. In this way alternate fjords are seen upon the ship in opposite directions, by going into one and coming out at another. If readers who have visited the deep and wide canons of the Rocky Mountains will imagine these canons to have, instead of small streams, navigable rivers in which ships can sail, they will get a fair idea of the fjords of Norway. To complete the picture they must add, here and there, innumerable cataracts, make most of the peaks snow clad, and have villages, churches and isolated homes scattered among trees, with here and there an occasional glacier. The water is so deep that the ship can sail near the coast with-

out danger. There is an abrupt descent into an abyss of water at the very edge of the shore. Like our Yosemite Valley, they are all cut out by glaciers. The people met on the short, overland trips between the fjords, are honest, truthful, peaceful, unostentatious, and accommodating. The flower-clad roads constitute a botanist's paradise. Even at the very tip of Europe, where the waters of the Arctic Ocean lave the shore, there is an abundance of beautiful wild-flowers. The globe-flowers and forget-me-nots are particularly beautiful there. The first named are double buttercups with petals folded-in like burnished golden roses. The tourist can gather these at all hours of the night with, in the absence of clouds, the bright sun shining upon him. At midnight, at 2 a.m., at 3 a.m., at any hour he chooses, he is at liberty to look at the sun. If sleep is desired, the state-room windows have to be curtained to keep out the light. Instead of setting, the sun circles round and round the sky, being in the south at midday and in the north at midnight.

The Vega only took us as far as Trondheim, the ancient capital of Norway. There we changed into the *Neptun*, another Norwegian ship. This carried us to North Cape and back. A very delightful part of this voyage is made among the Lofoden Islands where we were surrounded by numerous fleets of cod-fishing vessels. At the near-by city of Tromsø most of the cod liver oil for the world is made. At Hammerfest we visited the most northern city on our globe, and were surprised to find in its streets numerous electric lamps. These are used during the six months of continuous night that they are compelled to endure. They have one day and one night to the year. In summer it is all day. In winter it is all night. Numerous Laplanders can be seen here and on some of the Lofoden Islands. They are short of stature, dirty, and in many ways remind one of the Indians of our western plains.

On return to Trondheim we went by train to Upsala and Stockholm, in Sweden, instead of going back to Bergen. While we were in Bergen we recalled the fact that it is the birthplace of the great pathologist and expert surgeon, Theodor Billroth. The first resections of larynx and of stomach were done by him. He was professor at Zurich for some time but later removed to



DR. THEODOR BILLROTH.

Vienna where he taught in the university.

On reaching Sweden our first important stop was at Upsala. Here, in the university, the celebrated Linneus taught botany and here he wrote his famous "Systema Naturae" that revolutionized both zoology and botany. Here, too, Scheele resided for a short time hoping for recognition from the university which he never received. Both Scheele and Linneus made their homes at Stockholm before moving to Upsala, and both had to struggle against opposition and poverty. By a lucky accident Linneus won his way to wealth and honor, but Scheele's full worth was not realized until he was dead. While Linneus was striving to build



up a practice as a physician a lady-in-waiting upon the queen had heard of a prescription that had "miraculously" cured a cough and that he had written. She called upon him and got a copy of it. Fortunately it acted "like a charm," and the grateful patient told the queen of how she got cured of just such a cough as was troubling her majesty. The queen had Linnus prescribe for her and after that his fortune was made. Most of the rich people of the city made him their doctor and he soon became wealthy and renowned. His ambition to meet men of science and to have them give him a respectful hearing, that he had so long vainly sought, now were his. Thus it happened that so trivial an event as the writing of a prescription for a cold led to the acknowledgment of worth in an obscure and struggling savant whose ideas were scouted by those whom the world thought were the best of judges. But for that prescription it is pretty certain that our knowledge of living things would have been much less today than it is. Poor Scheele had no such good fortune befall him. His fame began to grow in France and England just before his death, but like most prophets he had little or no honor in his own country. Millions upon millions of dollars have been made from his discoveries but none of it reached his hands. Think of the money that has been made in the manufacture of glycerine, tartaric acid, gallic acid, citric acid, hydrocyanic acid, oxalic acid, benzoic acid, malic acid, and Scheele's green, and then think that he was the first man in the world to produce these and many other commercial substances, for all of which he did not even win the bauble—reputation, until it was too late to benefit him.

But Sweden had another great chemist and he, like Linneus, was more successful than Scheele. This was Berzelius. A park is now named for him and a fine statue that stands in its centre tells of his greatness. It is but a short distance from the Grand Hotel, Stockholm, the hotel patronized by

nearly every tourist and that is one of the finest in Europe, for situation, accommodations and comfort. After practicing medicine for a short time Berzelius turned his attention to chemistry upon which subject he lectured at the Military Academy. A little later and he became professor of medicine and pharmacy, then president of the Academy of Sciences, then chemist to the Swedish iron works, then a senator, and finally he was made a baron. To him we owe many of our chemical elements, many valuable methods of physical and chemical research, and he gave us our present system of chemical symbols. While in Stockholm we took several pleasant walks in Berzleius' Park. We also visited the tomb of Linneus and the statue of Scheele taking more interest in seeing these than in gazing upon the statues of Birger Jarl, Bernadotte, or of Gustavus III, that are deemed worthy of attention by strangers. From our window in the hotel we had a beautiful view of the Royal Palace, just across the Norrstrom. A peculiar public elevator, behind the palace, and known as the "Katarinabisson," was also in sight. The museums were immediately to our left and beyond them the Deer Park and the Tivoli. All of these were visited in turn and a trip taken to Drottingham and its beautiful summer palaces. Admission to all of the palaces was easily obtained.

On our first arrival in Stockholm we observed a number of particulars in which Swedish ways differ from ours, and on stopping, later, at Goteburg and Trolhattan we discovered more of them. In the bedrooms there is generally a huge porcelain affair that reaches from floor to ceiling and decorated as the plates, cups and saucers of our fathers used to be. This we learned is the kind of stove they use in winter. As soon as a traveller arrives he is shown to a room whither he is followed by a clerk with the hotel register. If the room is satisfactory the register is placed open before him, on a table, and

an inked pen handed to him. On looking at where he is expected to place his signature he discovers that a detailed history is wanted. At the top of the page, and across its face are printed in bold type the words: "Dato," "Namn," "Charactera," "Nation," and "Rum." Getting past the date and name the American guest is puzzled to know what to write under "Charactera." With Nation there was no trouble, but with "Rum" a guess had to be made as to the meaning. In the hall the observant traveller would note over one of the doors that he passed the startling words: "DAM BAD RUM" and elsewhere "BAD RUM." Such apparent profanity was not mitigated by the remembrance of the fact that a couple or three days before our train had stopped for fifteen minutes at a railway station distinctly and conspicuously labelled, in several places, with the name, "HELL." In demanding to know something about our character the suggestion occurred as to whether they wanted to know if we had been denizens of the last named place. In a few days we discovered that Dam meant lady, that Bad meant bath, and that Rum was the Swedish for room. In hotels and steamboats we discovered that no one is expected to wait at the table, foodless, until the waiter has time to take an order and serve it. As the guest enters the dining-room, or in the hall near the entrance, a table is spread with spiced foods, cheese, bread, crackers, and appetizing liquors. This is their so-called "smorgas," or appetizer. He goes forward, helps himself, carries this beginning of a repast to his table and proceeds to masticate the same while waiting for the waiter. A detailed account of the costumes of Delacarla, of the canals, lakes and locks, of the habits of the people, and of the many odd things seen during a tour of Sweden would extend this story beyond allotted space, yet all were interesting.

A night's ride in a "Sofvagn," or sleep-

ing car, carried us from Goteburg to Helsingborg. Here we crossed the Sound to Kronberg, the port of Elsinor, in Denmark. At Elsinor the tourist sees Hamlet's grave and the place where he is supposed to have seen his father's ghost. After a brief stay here we proceeded by train to Copenhagen. To the Dane this, his capital, is known as Kjobenhavn. The average Dane knows of no such city as Copenhagen until he comes in contact with foreigners. To the latter this is a delightful city by any name, however unpronounceable, and as a rule the Thorwaldsen Museum is the place first sought out. Whoever has been in Luzerne and seen its famous lion, carved among the cliffs, has ever after wanted to visit Denmark and see Thorwaldsen's masterpieces and his home. Whoever has seen his "Day," and his "Night," wants to see more of such work. While the average tourist is enjoying the original world famed "Tivoli" the dragon tower, the cathedral, Amalienborg, the Stork Fountain, Rosenberg Palace, etc., the medical tourist will desire to see the university where Kasper Bartholin taught medicine and Greek and the place where he wrote his celebrated Anatomie. It was here he discovered the glands of Bartholin and here that his son, at a later date, defended Harvey's circulation of the blood. The up-to-date doctor will also desire to see Finsen's Medical Institute and the State Serum Institute where Finsen and Madson have brought change and progress to the medical practice of our own day. The State Serum Institute is particularly worthy of notice, as the work of Dr. Madson, in conjunction with the work of Svante Arrhenius, of Stockholm, is bringing us to a true realization of the meaning of serum therapy.

From Denmark we proceeded to Hamburg by way of Zealand, Funen, Jutland, and Schleswig Holstein. In the latter state we passed near Tonning, the birthplace of Esmarch, of bandage and bloodless surgery fame. Our route was a much less comfort-

able one than that generally followed by tourists. We were routed out at 2 a. m. to change trains and have our luggage examined by the custom officers. Schleswig Holstein is German territory, has its own German trains and German officers. Had we gone by ship to Lubeck we would have had an all night sail without being disturbed till morning. Had it been stormy, however, it might have proven even more uncomfortable. Probably the two most interesting sights supplied by Hamburg to tourists is its harbors and park. The former is more fascinating than that of New York because of the complex mazes of canals, rivers and quays. The latter in part was at one time the site of a city wall or fortification. Beyond it, in one direction, lies Altona while in the opposite direction is the main part of Hamburg. The Zoological and Botanic Gardens are connected directly with the park. The anomalous relations of Altona to Hamburg is often a subject of comment. The laws and taxes of the two cities are quite different, and yet it is difficult for any one to know where the one ends and the other begins. Some stores have their entrance in one city and their windows in the other. It was here that medical science gained its first positive proof that water was responsible for the carrying of cholera. The water supplies of the two cities being distinct the infection could be traced to one of them to the exclusion of the other. The sights that principally attract travellers, aside from those already named, are the Elb Bridge, Alster Pavilion, Sandthorqual, Town Hall, Exchange, and St. Nicholas Church. The medical tourist is interested in knowing that this was the home of Fritz Schaudinn, the discoverer of the germ of syphilis, and that he died here a comparatively young man. As a protozoologist he had won a worldwide recognition.

From Hamburg we proceeded to Berlin, the Mecca of modern medical science. Most of the very interesting sights of Berlin,

exclusive of those of its environments, are found on, or near to, Unter den Linden, between the Brandenburg Gate and the statue of Frederick the Great. The Brandenburg Gate is the entrance to the Zoological Gardens. Unter den Linden is an exceedingly handsome street, always crowded in fair weather, and frequently a route for parades. It gets its name from the numerous Tilia, or "Linden" trees, with which it is lined. The American Tilia, or "basswood," is a larger leaved species of the same genus. The Arsenal with its Halls of Fame, the Palace of the Crown Prince, the Royal Library, the Opera House, the Palace of the Emperor, the Academy of Fine Arts, and the university buildings are all on or within easy reach of this thoroughfare. In the last named medical men should be greatly interested. Here the eminent chemist Stahl taught. Here he promulgated a medical doctrine that was almost a counterpart of Christian Science, but freed from the superstitions of the latter. He thought nature was almost all-sufficient as a disease cure if we would but have faith. Here his great rival, Hoffman, the first producer of Hoffman's anodyne, was often seen when serving as the physician of Frederick I. Here Schelling, the idealist, taught, as professor of Philosophy, and stamped the medical science of the succeeding generation with his mark. Here Schonlein, pupil of Schelling, started his "Natural History School of Medicine," the logical outcome of Schelling's teachings as modified by later views of science. Here Schiller, the army surgeon and great poet, likewise absorbed Schelling's views. Here, too, Goethe, the other great German poet and the prophet of Evolution, also took in inspiration from Schelling. Here Johannes Muller taught Physiology as it had never been taught before. Soon after getting his professorship in Berlin he started his "Archiv. fur Anatomie und Physiologie" and continued their publication till he died. Over 260 original contri-

butions to physiology, zoology, and psychology, came from his fecund pen. He sustained the position taken by the Scotch physiologist Bell regarding the functions of the nerve fibres. One has but to hear the names of his many renowned students to appreciate his great influence upon the



PROFESSOR ROBERT KOCH.

development of modern medical science. Is there not magic in the names of Virchow, Helmholtz, Haeckel, DuBois Raymond, Ludwig, Volkman, and Brucke. These all studied under Muller and all drank in the inspiration of his forceful teachings. Schwann, too, the first man in the world to see an animal cell, was trained by him. Virchow took the chair of Pathological Anatomy in this university, in 1856. He first started students in the study of microscopical anatomy. His "Cellular Pathology" was published in 1858. It opened up a new era for medical science. He cleared up our ideas regarding pyemia. Helmholtz began work as an

army surgeon, took the chair of anatomy at the university in 1848, changed to the chair of physics in 1871 and died in 1894. To him we are indebted for the ophthalmoscope, for our knowledge of tone sensation, for our knowledge of the sound spectrum, and for multitudes of experimental proofs of the doctrine of the conservation of energy. This doctrine has wrought as great a change in human thought, and in all scientific thought, as has the germ theory of disease, or the theory of natural selection. It would make a long story to tell of all the good things that have come to medical science from Berlin University and from its professors and students who are scattered over the world. We must not, however, pass unnoticed the names of Oskar Liebreich, among the dead, and of Robert Koch and Emil Fischer, among those who are still alive. To Liebreich we are indebted for our knowledge of chloral hydrate and of lanolin. In his theory of "noso-parasitism" he anticipated Wright's doctrine of "Opsonins." In isolating cholin and protagon he made a first step toward a chemistry of brain tissue and of the chemistry of the cell nucleus. Of Robert Koch every medical man in the world has heard. His isolation of the tubercle bacillus and his proof of its being the cause of tuberculosis constituted a brilliant and epoch-making piece of work for medical science. He is now professor in the university and director of the new institute for infectious diseases. His countrymen paid him the honor he was well worthy of and took pains to let all the world know of the great work he had done. They do such things better in Germany than we in America. There is there no "Conspiracy of Silence," as Doctor Salmon once called it. Every American doctor knows of the work of Koch. What relative proportion of them know of the work of Theobald Smith? In my humble opinion, greatly as I appreciate the work of Koch, I cannot help believing that that of Smith is greater still. Each opened up a new epoch



for medical discovery. Koch's task was exceedingly difficult, but Smith's was still more so. What Koch is to medical bacteriology Smith is to medical protozoology. Without Smith's work I am unable to conceive of how Manson and Ross could have given us our present knowledge of trypanosomiasis and of malaria. Unfortunately for Professor Smith the immediate result of his work was related to cattle and not to human beings. Fortunately for Professor Koch his work had a direct bearing upon a human malady. As far more human beings suffer and die from malaria, yellow fever, trypanosomiasis, and kindred protozoon diseases, than from tuberculosis, the American's work is the more beneficial in its far-reaching and important effects. Please let the reader remember that I would not for any consideration try to have him look lightly on Koch's work. On the contrary, the world is never likely to bestow upon him more than a small fraction of the honor which is rightly his. This, however, should not blind us to the merits of a countryman of our own who is at least his peer, but who, through a false and vicious policy of our own educated classes, has failed to receive any reasonable approach to the respect and honor that we all owe him. There are many other Americans who are suffering from this dry-rot-of affectation that maximizes European scientific work while minimizing that done in our own country. I may be mistaken, but it all looks as if short-sighted jealousy was the indirect cause—the fear that some other scientific worker might outclass and overshadow ourselves. We yet have to learn the lesson that is said to have been so pointedly put by one of the signers of the Declaration of Independence, that "We must all hang together, or we will hang separately."

But this is a digression from our story of Berlin. There is now at work there a comparatively young man whose labors are opening up to our understanding what may almost be called the very Holy of Holies of

the Temple of life. This man is Professor Emil Fischer, the great biological chemist. My readers ought to become acquainted with his work if they are not already familiar with it. Here, indeed, "Coming events cast their shadows before." The knowledge he is supplying concerning polypeptides carrying us into the heart of true physiology and laying the foundation for a structure that promises to soon give us secrets concerning living things not at present dreamt of in our popular philosophies.

Before leaving Berlin we took a trip to Potsdam to see the birthplace of Helmholtz. Incidentally we "did" the Royal palaces, the Orangery, the Sicilian Gardens, Sanssouci, Babelsberg, Fiedenskirche, Pfingstberg, and the Charlottenhof. After this feast of artificially produced beauty, and after several interesting carriage rides through other suburbs of the city we took a train for Amsterdam. We had intended going to the Hartz Mountains, seeing the wonderland of Hans Christian Andersen, and getting a peep at the Spectre of the Brocken, but when a tourist goes on the Spree he is likely to be so captivated by its environing charms that he dallies too long to leave time for other enjoyments. Had we visited the Hartz country a stop at Gosler would have been made. Being then interested in alkaloids the production, by Dr. Albert Neumann, of cocaine was attracting our attention, and Gosler being his home we wanted to see it. As our train sped toward the west we hoped that it might take us in that direction, but instead it went considerably north of that place after passing Halberstedt.

Concerning the country between Berlin and Amsterdam my diary, for some reason, says but little. It mentions the fact that the women seen from the car windows wore strange looking costumes, and that on our entering Holland we had to turn our watches back an hour. Once in Amsterdam we recalled the fact that it is a city

built upon some ninety islands that, like Stockholm, its houses are supported on stakes driven into the ground, that Erasmus once referred to its people as living like birds on the tops of trees because of their homes resting on the tops of these stakes, that most of the diamond cutting of the world is done here, and that it was the home of Rembrandt. No other city in the world so nearly resembles Venice in having canals for streets, boats for carriages and horses, and doing most of its transportation by water. Its Museum van der Hoop, Museum Fodor, and Rijks Museum constitute the centers for sight seeing tourists. Its zoological and botanic gardens are the attractions for naturalists. The latter is where Prof. Hugo de Vries raised the evening primroses that appeared to spontaneously develop new species *per saltum*. The solving of the problem as to how and why these flowers changed their specific characters so suddenly is one of the puzzles of the present-day biology and one on which hangs much of practical interest for future medical science. A visit to suburban Zaandam is always in order as every traveller wants to see where Peter the Great donned the attire of a common workman and sought to learn the mysteries of Dutch ship building, in order to strengthen the maritime power of Russia. When in Zaandam tourists can scarcely see anything for the numberless windmills. In journeying from there to Haarlem these dominate everything but the dikes. The wooden shoes, baggy trousers, and strange head-gear of the men and the equally fantastic costumes of the women are every where in evidence. Everybody there seems to work, but the women and dogs are the chief beasts of burden. All the farmers try to own a number of dogs to do their heavy work, but when too poor to buy these they do not hesitate at yoking up their wives and daughters to the carts, and plows, or loading them up with immense baskets filled with produce to carry to mar-

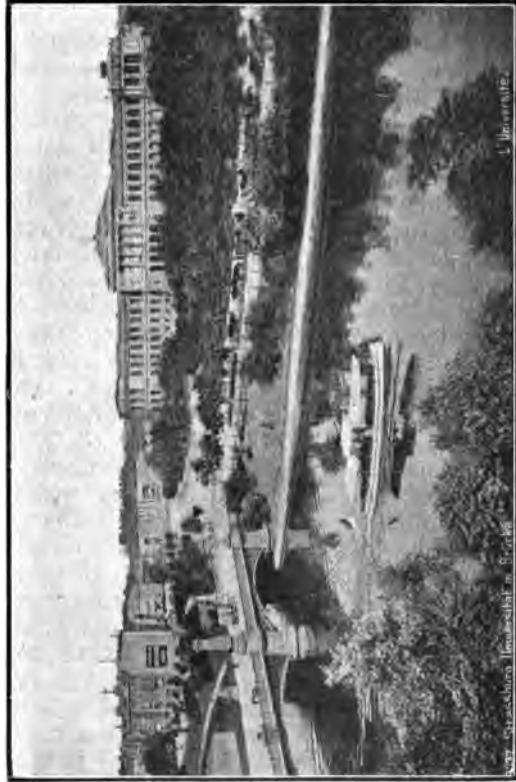


BERLIN HOSPITAL FOR NERVOUS DISEASES.

ket. When not thus employed every woman in that country keeps hard at work, anyway, cleaning and scrubbing themselves and homes. Nowhere else in the world is there so much "elbow-grease" put into the scrubbing of floors, doors, or furniture. This kind of work seems to be a perfect mania among them. The great industry around Haarlem is the raising of lily and other bulbs for foreign gardens. In the season of flowers the country around Haarlem is one vast flower garden. From there to Leyden is a monotonous repetition of dikes, dogs, ditches, and dams, with windmills by the hundred. The great attraction of Leyden is its university. The Leyden jar of the electrician got its name from here, Here Boerhaave first used the thermometer for clinical purposes, and here he established the first successful clinics at a university in order to facilitate the education of medical students. Here he gave the first special lectures on ophthalmology and here, in his clinic, he compelled Peter the Great to await his turn among a lot of charity patients. Here the first famous lithotomist, Rau, taught anatomy and surgery, and for the first time used a cadaver for purposes of demonstration. Here Le Boe, commonly called Sylvius, taught his chemical system of medicine which, though fantastic, led to research and discovery. In the University of Leyden many of the greatest men in various of the sciences were taught. From Leyden we proceeded to the Hague. This is the prettiest city in the Netherlands. Its streets contain fine houses and its canals are not numerous enough to be wearisome. Its private gardens are full of pretty flowers. Its promenades are filled with handsome trees. To us the statue of William the Silent was one of its most interesting sights. This George Washington of Holland dared to defy the brutal and inhuman Philip II of Spain, and fight for political and religious liberty. From the Hague we took trips to Scheveningen, the great watering-place of Northern

Europe, and to Delft, the original home of pottery in Europe. To us the interest of this last named queer Dutch town resided in the fact that it is the birth-place of Anthony van Leeuwenhoek, the man who was the first to microscopically study the brain, the arterioles, bacteria, and protozoa. He first showed how the veins were connected with the arteries and clinched the truth of Harvey's doctrine of the circulation of the blood. In this city, too, De Graaf practiced medicine. He discovered the graafian follicles of the ovaries. After seeing Rotterdam we hastened on to Antwerp. We had often heard of its beautifully finished cathedral and wished to see it, as well as to see the city in which the first bible was translated from the original languages, by Tyndale. He, poor fellow, was burnt as a heretic at the stake because of his devotion to religion. In the south transept of the cathedral is Reuben's famed masterpiece, "The Descent from the Cross." This great painter is buried here, in the Chapel of St. Jaques.

From Antwerp we proceeded to Brussels, the Paris of Belgium. It is in many ways a small replica of Paris. Its Grande Place is declared to be the "finest medieval square in existence." Its Galerie St. Hubert and connecting arcades constitute as pretty and attractive a shopping place as there is in any country. Its Palais de Justice is one of the largest buildings in the world. It occupies more ground space than St. Peter's at Rome and cost ten millions of dollars. On the Rue Royal is the house in which the Duchess of Richmond gave the celebrated ball on the night before the battle of Waterloo, and to which Byron refers in his poem on that battle. In the Place d' Orange there is a statue to Vesalius, the man who redeemed medicine and surgery from ancient ways. He was born here. We have already referred to him as a professor at Padua and elsewhere. This, too, was the birthplace of van Helmont and his statue can be seen in the grain market.



UNIVERSITY BUILDINGS, STRASSBURG, GERMANY.

He modified the system of Paracelsus into a more acceptable type of medical practice.

After visiting the field of Waterloo we proceeded to Cologne, saw its renowned cathedral and the old home of Karl Marx, the great socialist, as well as a number of the interesting things around and in that city, and then proceeded to Bonn. The University of Bonn is its chief sight. Here the present Emperor of Germany was taught, here Johannes Muller, to whom reference has already been made, prosecuted his medical studies. Here Helmholtz taught and here Liebig, the world-famous chemist, graduated. Here, too, Karl von Noorden, now professor of Physiology at Vienna, and great authority on diabetes, was born. From Bonn to Mayence we sailed on the far-famed River Rhine, saw its castles, its vineyards, its romantic and attractive scenery, and its Lorlei. After a short stop at Coblenz we continued our journey to Bingen where we again made a stop and then proceeded to Mayence. Coblenz is the birthplace of Johannes Muller. From Mayence, we went by train to Darmstadt, the birthplace of the great chemist, Liebig, and the site of the chemical works of E. Merck. These works have stood in Darmstadt for over a century, and in them has been manufactured most of the organic, chemical remedies prescribed by medical men throughout the world. Here the first morphine and quinine, made in commercial amounts, was produced. During our stay at Darmstadt we took a trip to Frankfort before going on to Heidelberg. Every visitor to Frankfort is sure to see the birthplace of Goethe; the bridge with the old iron crucifix and rooster, on the Main; the printer's monument to Guttenberg, Faust, and Schaeffer, the first of the world's printers using movable type, their homes having been here; the statues of Schiller, and Charlemagne; and the grave of Schopenhauer. Medical tourists are sure to go and see Dr. Senkenberg's Citizen's Hospital,



his medical institute, his anatomical theatre, his botanic garden, and his library. The museum of the Senckenbergsche Naturforschende Gessellschaft will likewise be of interest to them. But above all else the new Royal Institute for Experimental Therapy, under the care of Dr. Paul Ehrlich and his collaborators, will attract the attention of the up-to-date medical man. Here the wonderful research work of Ehrlich, Morgenroth, Neisser, Lipston, Rehns, Sachs, von Dungern, Proscher, Shiga Marx, and Keyes has been carried out. The foundation for such work was first made in this country by Salmon and Theobald Smith and then carried on by Roux, Behring, and Kitasato. Through such work we are solving the secrets of immunity.

At Heidelberg we were greatly interested in the beauty of its surroundings and in its old university—the oldest in Germany. Its famous castle, high above the city and above the Neckar River, adds materially to the beauty as well as to the historical interests of the place. Large numbers of American students come here to finish their education so that it is a place that is well known to many Americans. The great Helmholtz, to whom we have already referred, taught physiology here and away back in 1653 Brunner, for whom Brunner's glands are named, was likewise a professor in the university. Brunner studied medicine at Strassburg and to this city we made our way after leaving Heidelberg. In Strassburg Kobert, the great toxicologist and pharmacologist, of Rostock, was born and Professor Paul Ehrlich studied medicine here. Every school boy has heard of the great astronomical clock in the cathedral of this city and longed to hear it strike and see its procession of strange figures at the striking hour. Almost every person must have seen pictures of Strassburg storks standing upon one leg on the quaint old-fashioned chimneys of this curious looking place. A view of the city from the cathedral tower is worth a long journey to see.

From Strassburg we went by rail though the corner of the Black Forest to Schaffhausen, the birth-place of Johann Konrad Peyer, the discoverer of Peyer's glands. Most typhoid patients who are seriously attacked with this disease learn sooner or later, something about "Peyer's patches."

A short journey from here brought us to the celebrated Falls of the Rhine. After drinking in their beauty for a while we took the train for Zurich, Switzerland. Here Oken taught, and near here Paracelsus was born. Haeckel tells us that Oken's ideas came nearer to those of Darwin than did any other predecessor. Paracelsus taught medicine in Basil until wine upset his equilibrium and caused him to accuse all doctors and pharmacists of ignorance and dishonesty. They then turned around and pronounced him the worst of quacks. We owe the use of mercury in syphilis to him, and he first rescued the use of cinchona from the Jesuit priests. The great embryologist and anatomist Wm. His was born at Basil.

Our next stopping place was Berne, the home of the great physiologist, Haller, who first taught us the doctrine of muscle irritability, and who as a botanist was surpassed only by Linneus. Berne was likewise the home of Dr. Kocher who first showed us the way to the discovering of the functions of the thyroids. The beauty of Swiss scenery it is unnecessary here to describe, nor need I tell of our interesting tours through Swiss mountains and Swiss valleys. It would only be the repeating of an oft told tale. With Switzerland ended our tour of the "Lands Where Medical Science Evolved." To have completed the picture Austria-Hungary and Russia should have been included, but these countries we have not yet visited, though we hope to be able to do so before long, and thus be able to tell the readers of the "Medical Fortnightly" something about a number of medical worthies who have not been mentioned in our narrative, but who have done much to help medical science to its present exalted position.

## THE BIRTHPLACE OF BILLROTH.

191 Dean Street, Brooklyn, N. Y.,  
March 29, 1910.

Editor Medical Fortnightly:

All well-informed students know that history is slippery ground, and that censorious critics have said many hard things about its inaccuracy. A slip of mine, which Dr. H. Stern kindly points out, is a forcible reminder of how easy it is to err in such matters. In my letter on "Scandia to Gallia Cisalpina," Bergen in Norway has been credited with being the birthplace of Billroth. The impression received from my readings, prior to visiting that place, are responsible for the statement which now seems to be an error, Billroth was born in Bergen, on the Island of Rugen, in the Baltic, not far from Stralsund, the birthplace of the Swedish chemist Scheele. In my letter reference should have been made to Billroth and to his accomplished teacher, Langenbeck, as part of the description of Berlin. The great prominence of Norway's Bergen and the relative obscurity of other Bergens appears to have puzzled a number of authors. In two histories, just consulted, the birthplace is given as "Bergen" without regard to which of many Bergens is meant. Naturally readers fail to think of the Bergens of Belgium, The Netherlands, New York, New Jersey, or the three Bergens in Germany, and do think of the one best known. The correction is timely and may save future writers from the same mistake.

Very sincerely,

R. G. ECCLES.

## ACROSS NORTH AMERICA—WEST- WARD.

Every reader of the Medical Fortnightly must be familiar with the parable in which the kingdom of heaven was likened to a man who hired laborers for his vineyard, paying to each the same daily compensation whether they began work at 5 a.m. or at noon. The objectors to this seeming unfairness were peremptorily told that a master had a right to do as he saw fit with his own property, and that they ought to learn that in the kingdom of heaven destiny had so arranged things that "the last shall be first and the first last." In these travel tales such a reversal has actually occurred, bringing our country in at the close, and, if our attempts at prevision are not seriously faulty, the United States though the last to begin work in the vineyard of biology, is destined to become first in the amount and quality of the work it is going to accomplish. For the very brief period of its efforts the returns are, relatively, greater than those of many older nations.

Thanks to the generous liberality of our Rockefeller, Carnegie, Elizabeth Thompson, the McCormicks, Johns Hopkins, Phipps, and others, funds and laboratories have been supplied and an example set for still other conservors of public wealth to go and do likewise, when the stream of gold they have had the skill to direct begins to transcend their power of utilizing it in new productive channels. We are already rapidly hurrying into the forefront of science, but our great danger—the incessant danger of every democracy—menaces us with defeat.

This danger is due to speed madness on one side and sentimental hysteria on the other. Impatience and pity the two best yet two worst traits of human nature—make excellent servants but woefully brutal masters. Like a holocaust of consuming flame they can be fanned into horrible uncontrollability by trivial causes. They are the agents that direct would be reformers and the latter are the anarchists of science. In the name of reform they invoke the fetish of legislation, hoping to accomplish in an hour what would require a century. They fail utterly to appreciate the fact that evolution is and must be slow. Compulsory progress always means weakness in progress where it does not mean positive reversion. This is why he who announces himself as a reformer is usually at heart a rampant anarchist, defying nature as the political anarchist defies government. Utterly oblivious of the established harmonious adjustments of beneficent forces, that lie too deep for his superficial methods of mental analysis, he seeks compulsory adjustments that disrupt, tear, and rend society to its core and along lines that he never dreamed he was going to affect. Blind and oblivious to everything except the relatively trivial evils, that nature was at work curing before he was born, he exaggerates these evils from molehills into mountains and the bewildered masses, taking his madness to mean earnestness in their behalf, help him into power. Usually he is right regarding the existence of the evils he points out, and he would be an excellent educator if he could be put into a straight jacket as soon as his symptoms are so severe that he asks for legislative aid to do that which in the nature of things, neither he nor the legislators can appreciate the seriousness of meddling with in that manner. In biological work the danger from impatience and short sighted pity are intense. They work together in a vicious circle. A demand for quick results, in order to have weapons with

which to pacify, confound, or defeat hysterical objectors to such work leads to the intensification of the very conditions against which the sympathetic protest.

Proper experiments—those that are really scientific—are intelligent questions put to nature in order to get its "Yes" or "No." The reply, usually anticipated, confirms or corrects the ideas of the experimenter. Haphazard experimenting, with the vague hope of a chance discovery, Tyndall has said, is jargon addressed to nature, and the reply is usually likewise jargon. The torture of animals with jargon experiments is atrocious. Ignorant sentimentality intensifies public impatience and the attempt, on the part of experimentors, to hurry up results brings unnecessary cruelty. If we, as physicians, wish to stop physiological cruelty we must turn deaf ears to those who would place unsympathetic overseers over our experimentors. The way to make jargon experiments abhorrent is to pillory with contempt all who resort to them, and use existing laws to punish them. Paid inspectors can never understand or sympathize with science. America should, and can, take the lead in the important task of advancing medical science. Let us help it by understanding its needs and directing public sentiment away from the support of its enemies. Already the good work is progressing and this travel tale aims to show its promising character. In presenting the facts in the way here used I desire in this, as in prior communications, to imitate the Bishop of Bedford in that,

"The care-worn traveller in dusty ways,  
The things that I see shall see,  
And give to the Giver his song of praise,  
As he shares my joy with me."

In seeing North America the writer has, when taking his summer holidays, adopted the plan of visiting, in successive years, places of historic interest, scenic interest, botanic interest, geologic interest, etc. Our country has thus been seen, piecemeal.

## BROOKLYN.

Brooklyn, where my transcontinental tour began, is known as the "City of Churches," but, besides a long list of these it contains a dozen hospitals, eight or ten dispensaries, the world famous Greenwood Cemetery, the incomparable Coney Island, the world's finest suspension bridges, two parks of intense historic interest, fine public buildings, a subway in which travellers pass beneath an arm of the sea and have immense ocean steamships sail over them, a Long Island College Hospital where the first American experiment of bringing medical teaching and medical training together was begun in 1857, a pathological laboratory, etc. A few minutes walk from where these words are being written the fate of the United States, as a nation, hung in the balance as never before nor since. In Prospect Park the British and American troupes had one of their most fierce battles. By a mistake of General Putnam, the American troops were caught in a trap where absolute annihilation threatened them. At Gowanus bridge the soldiers of Cornwallis were held at bay for ten minutes—the most precious ten minutes in American history. It enabled our army to escape destruction. The Brooklyn Institute of Arts and Sciences has been doing much for biology, and thereby for medicine, through its Cold Spring Harbor marine laboratories. Every summer this is a Mecca for many biologists who there have made discoveries in heredity, tissue regeneration, organ transplantation, embryology, and prenatal malformations. The Carnegie Institute station for Experimental Evolution is likewise there and, practically new creations in animal life have been produced therein, by Professors Charles B. Davenport, W. L. Tower and others. The new botanic garden of the Brooklyn Institute is under the care of C. S. Gager who has, experimentally, created some new plants. It was George R. Fowler, of Brooklyn, who first



SENEY HOSPITAL, BROOKLYN.



started the first aid to the injured classes, and to him the world is indebted for a method of gastro-enterostomy, of total pleurectomy, and of inguinal hernia. He also worked out a valuable method of preparing catgut and "Fowler's position," after operating in peritonitis, is known to all surgeons. L. S. Pilcher, another Brooklyn surgeon, introduced a new method of reducing Colles' fracture, and a new method of treating hemorrhoids. A. J. C. Skene produced what is, probably, the best work on gynecology in our country. Charles Jewett was the first in America to perform symphyseotomy. The writer experimentally established the United States Pharmacopeial test for pepsin, that afterwards became, with slight modifications, the test for the world; performed the first experiments upon the effects of acids, antiseptics, and drugs generally, on pepsin, and first showed the value of benzoic acid as a preservative.

#### NEW YORK CITY.

Across "East River," from Brooklyn, is the borough of Manhattan. Its "skyscraper buildings," Wall Street, Broadway, Bowery, Fifth Avenue, Riverside Drive, Central Park, Bronx Park, botanic garden, zoological garden, aquarium, public museums, public buildings and monuments, command the enthusiastic attention of most visitors. Patriotic Americans are interested in visiting Washington's statue, that stands on the spot where he became the first president of the United States, and learning that when there they are surrounded with more than the wealth of Croesus. The mint faces them, J. P. Morgan's offices are behind them, while banks and safe deposit vaults surround them. So numerous are the hospitals and dispensaries of Manhattan that medical visitors would be wearied inspecting them all. Here they could spend weeks seeing all sorts of new operations and learning of many methods of treatment. With such advantages it is surprising that it remained for John A. Wyeth, of our own

generation, to think of utilizing them by starting his Polyclinic—the first American post-graduate college, and, today, the most successful. Medical men from all parts of the United States come here to round out their education under his special care. It was in the same borough that the first American medical journal, the New York Medical Repository, saw daylight, under



DR. JOHN A. WYETH.

the editorial care of Elihu H. Smith. Here Samuel Bard helped found King's College and, in 1807, became dean of the College of Physicians and Surgeons—the first American medical college to demand a high standard of education. Here James Macneven started the first American Medical Chemical Laboratory. Here David Hosack introduced to our country vaccination, the stethoscope, quarantine, ligation of the femoral artery in the upper third of the thigh in imitation of Scarpa, and advocated the establishment of municipal hospitals for contagious diseases. Here Wil-

lard Parker performed cystotomy for the first time in America and also operated for appendicitis. He was one of the organizers of the New York Pathological Society. Here John Torrey turned his attention to American botany and helped lay the foundation for our knowledge of evolution. Here Valentine Mott won his reputation in surgery by becoming the American pioneer of many difficult operations. Among these was excision of the collar bone for osteo-myelitis and the ligating of the innominate artery for aneurism. Here John C. Dalton introduced class experiments in physiology, did his work on the Corpus Luteum that won for him the A. M. A. prize, and gained the reputation of being the first American professional physiologist. Here Alonzo Clark introduced into American practice the use of sodium salicylate in rheumatism. Here Austin Flint popularized physical diagnosis and by aid of his facile pen kept medical men interested in the progress of medicine. Here J. Marion Sims revolutionized the practice of gynecology for the whole world, invented the duck-bill speculum that bears his name, introduced the use of silver sutures, and treated vesico-vaginal fistula with a success never before approached. Here Henry Draper taught us how to use photography in medicine, determined the function of the spleen, and very materially advanced 19th century astronomy and physics, particularly in the direction of stellar spectra. Here J. A. Wyeth, besides founding our first post-graduate college, as already mentioned, lessened the death rate by substituting ligation of the external carotid for ligation of the common carotid, introduced his bloodless method of amputating at the hip joint, and greatly improved the treatment of vascular tumors by cooking them with water injected into their substance. His essays on the Carotid Artery, and on the Innominate and Subclavian Arteries and his most excellent volume on Surgery have added materially to our knowledge of anatomy and surgery. The

essays won for him two prizes from the American Medical Association. Here Simon Flexner enriched our knowledge of cerebrospinal meningitis, of its treatment, of plague, of bacillary dysentery, of toxins and antitoxins, and of snake venom. Here Eugene L. Opie discovered a multitude of before unknown facts concerning the anatomy and pathology of the pancreas, of its relationship to diabetes, of the nature of inflammation, of protozoon infections, of enzymes in inflammatory exudates, and of enzymes in the bone marrow. Here Christian A. Herter has discovered a world of facts regarding the flora of the intestines and has very materially added to our knowledge of chemical pathology. To him is also due the credit of giving to America its first Journal of Biological Chemistry. Here S. J. Meltzer, through the munificence of John D. Rockefeller, has established the world's research laboratory, given us new information on the mechanism of deglutition, on the bactericidal action of the blood, on how fluids are carried from the peritoneal cavity into the circulation, on the absorption of strychnine and hydrocyanic acid by the mucous membrane of the stomach, on respiration without respiratory movement, on toxicity of the bile, on the physiology and pharmacology of magnesium salts, on pseudo-tuberculosis, and on the relation of lesions to the multiplication of and infection by bacteria. Here Gary N. Calkins, although not a physician has advanced our knowledge of cancer, smallpox, and pathogenic protozoa. Here H. H. Rusby advanced our knowledge of medicinal plants. Here P. A. Levene discovered new facts about nucleoproteids of the spleen, leucin in animal proteins, phloridzin effects on the bile, and gelatin. Here H. Noguchi simplified the Wasserman test, and enriched our knowledge of lecithids, snake venoms, toxins, hemolysins and eosin. Here C. McBurney evolved new methods for gallstone operation, abdominal aorta compression, and in-

cision in appendicitis as well as making us familiar with McBurney's point. Here A. Jacobi advanced our knowledge of diphtheria, intestinal diseases, the origin of calculi, the thymus gland, and of heredity in syphilis. Here E. L. Keyes produced his evacuator and prostatectomy pad, and developed his operation for varicocle as well as gave new facts on venereal diseases. Here Christian Fenger evolved his operations for ureteral stricture, and valve-formation of ureter. Here E. B. Wilson advanced our knowledge of the cell, and T. H. Morgan supplied new facts in embryology, regeneration and comparative anatomy. Here H. F. Osborn has increased our knowledge in the causes of evolution and pointed out the fact that disease is a factor in natural selection. None of the last three are physicians. The present writer deems this association of disease with natural selection exceedingly important for the future of medical science. To me it seems almost a certainty that our entire interior structure is an accumulation of myriads of selected defences against disease.

#### ALBANY.

After seeing New York, a trip up the Hudson River, by the day boat, to Albany, is one of the things no visitor should miss. It is the nearest approach to a sail through the fjords of Norway that our Atlantic coast can supply. The scenery is enchanting and, in its primitive wildness, must have been very alluring to Henry Hudson and his Dutch crew when they sailed up it with the hope that it would lead them to the Pacific Ocean and to Asia. The basaltic cliffs, known as the Palisades, tell us of some ancient volcanic eruption that covered the region with lava, and the deep-cut channel of the river attests how the ice of the glacial age cut its way through the same on its passage toward the sea. Sleepy Hollow, and the Catskill Mountains, are reminders of Rip Van Winkle and his long sleep. West Point is a beauty spot

where young Americans are trained in the art of war. Many handsome country homes, of rich New Yorkers, and many pretty towns, nestle along the green slopes of the river's bank. The West Shore and the Hudson River Railways skirt the respective banks most of the way to Albany, so that the passage of passenger and freight trains on both sides of the river, and going in both directions, are continuous additions to the interest of the trip. To the historian Albany will always be of interest as the first Dutch settlement in America, as the second oldest settlement of white men on the Atlantic coast, and as the capital of the richest State in America. To the Dutch it was known as Beverwick, and as Willemstadt, but when captured by the English in 1664 the name was changed to Albany in honor of the Duke of York and Albany. New York got its name from his first title and Albany his second. As lord of the Highlands of Scotland, then known as Albany, he thus conferred a Scotch name on the city but, singularly enough this same name was the one by which all of Britain was known to the Romans when Aristotle wrote his "Treatise of the World." The capital is Albany's finest building and cost the State nearly twenty-two millions of dollars. The building, however, that is likely to be of greatest interest to medical men will be its medical college. There the man received his medical degree whose research work has counted for more than that of any other American, so far as the future of our knowledge of disease is concerned, and in that city he was born. He and Salmon were the first in this world to produce artificial immunity toward disease by inoculations of toxins formed during bacterial multiplication. Roux and Chamberland, of the Pasteur Institute, have been given the credit for this when in fact it was first discovered by Americans, in America. Until this discovery had been made we could have known nothing about antitoxins or of immune sera. Our whole modern knowl-

edge of immunity against disease had its birth in these experiments. To this same gentleman we are indebted for our first step in our knowledge of the self-digesting power of tissues, removed from the body under strict antiseptic care. The far-reaching consequences of this discovery of his are only beginning to be appreciated by students of Mendel's law who are familiar with pathology. During Ehrlich's visit to America this same gentleman called the German pathologist's attention to the strange fact that when animals are injected with a foreign serum repetition of the dose, a week or two later, leads to serious or fatal results. From this beginning we got our modern knowledge of anaphylaxis, that is likely to play havoc with a lot of the old notions we had concerning the physiology of digestion, and that is pretty certain to enlighten us on idiosyncrasies toward foods and medicines. When it comes to be applied to embryology we may see a revolution in our ideas. Our most serious cases of asthma are also likely to have light thrown upon them from this quarter. The same gentleman, assisted by Dr. Kilborne, worked out the life history of the protozoon of Texas fever. This work was epoch-making for protozoology inasmuch as it gave the clew to the life histories of the malarial and other such parasites. The task was then, probably, the most difficult one of the kind ever undertaken, because of its great complexity and its covering two generations of the infected animals, besides the infected ticks. Koch's work with the tubercle bacilli was much simpler. Among many other exceedingly important contributions to medical science that have come from him are his discovery of where discontinuous sterilization may be ineffective, his researches on bovine and human tuberculosis, on the production of indol by bacteria, on the differentiation of related bacteria by their pabulum, and on the production of immunity with balanced or neutral mixtures of toxin and antitoxin. Four of his

discoveries appear to be epoch-making, and any one of these four would have immortalized the discoverer in Germany, France, or England had he resided in one or other of these countries. If ever scientific man deserved to be honored with Nobel prize, or peerage, it is this author's honest conviction that that man is Professor Theobald Smith, of Harvard University. He is a stranger to me, personally, but as a student of science



THEOBALD SMITH, M. D.

I know of no other man of our day who has opened up so many new and important regions by research. American silence is construed in Europe to mean American indifference and where such indifference exists prizes are not going to be bestowed. Our statesmen and politicians show no such indifference and our country has been glorified accordingly—in politics.

#### SARATOGA SPRINGS.

From Albany we proceeded by rail to Saratoga Springs, drank of its effervescent



waters, that nature has there so bountifully supplied, visited Mount McGregor and the cottage in which General U. S. Grant died, and after taking in the beauties of the great summer resort proceeded to Caldwell. Here a trip up Prospect Mountain gives the visitor a magnificent view of Lake George and a sail on the lake steamboat to Baldwin proves to be a continuous panorama of ever changing beauties. A four miles trip on the train to Fort Ticonderoga, takes the tourist to the Lake Champlain steamboat which carries him through another ever changing maze of mountain beauty. Landing at Plattsburg he is ready for carriage rides to Bluff Point, Ausable Chasm, and a short distance into the Adirondack Mountains where he can see the last resting place of poor John Brown whose body has so often been sung about, as mouldering in that grave. While Brown will recall to the mind of the visitor our Civil War the numerous stopping places bearing the pre-name "Fort," that cover the country from Saratoga to Canada, will recall the French and English wars and our war of the Revolution.

#### MONTREAL.

The trip from Plattsburg to Montreal is a short but, historically, very interesting one. The points of chief interest to medical tourists, in Montreal, are McGill College, Mount Royal Park, the General Hospital, Royal Victoria Hospital, Hotel Dieu, St Helen's Isle, the great Victoria Bridge and Lachine Rapids. McGill College will, of course, be associated in their minds with William Osler and John G. Adami. The former won fame through his brilliant ability as a teacher, his classical studies in cerebral palsies of children, his investigations of chorea and choreiform affections, and his studies of gastric cancer, abdominal tumors and angina pectoris. His System of Medicine is the most complete work of its kind ever produced by an American. Dr. Adami has given to the profession what

is probably the most thorough and up-to-date text-book on Pathology that has ever been published. His researchs on the mammalian heart, inflammation, heredity, cirrhosis, cancer, and tuberculosis have won for him world wide recognition as an



J. GEORGE ADAMI, M. D., F. R. S.

able investigator. Osler graduated and taught at McGill and Adami is Professor of Pathology there. Mount Royal Park lies immediately behind the University and from the summit the visitor can have a most fascinating view that extends to the Laurentian Hills, the Adirondacks, up and down the St. Lawrence River, and off into the Green Mountains of Vermont, while immediately below lies the city of Montreal. The public park on St. Helen's Isle is beautifully laid out. The "shooting," in a steamboat, of Lachine rapids is one of the thrilling experiences of a visit to this region.

## QUEBEC.

Side trips to Quebec and to Ottawa added to the interest of our visit, the former by boat and the latter by train. Quebec is very much like many of the old European cities in its narrow, steep streets, its fortifications crowning the hill, and its numerous French-speaking inhabitants. The view from the Chateau Frontenac is very fine, and the trip to Montmorency Falls exceedingly interesting. Ottawa is much more modern than Quebec and its Houses of Parliament, occupying the highest point in the city give it a stately and artistic look. Ottawa river recalled to my memory Moore's Canadian Boat Song that, as a boy, I had often sung. In the evening the moon shone brilliantly overhead and on repeating the words,

"Ottawa tide yon trembling moon,  
Shall see us float over thy surges soon,"

I became for a moment a child again and felt the old longing that the song formerly produced of, "How I would like to see that place and row a boat on that lovely river."

## TORONTO.

On our return from Ottawa to Montreal we took the Steamboat Spartan for a long, two days sail up the St. Lawrence River to Toronto. The successive rapids were passed by taking canals that skirted the edge of the river. The sail through the Thousand Islands was charming, although we had been there before and spent a couple of weeks at Thousand Island Park Hotel. The beautiful cottages on many of the islands give them a most attractive and poetic appearance. The entire St. Lawrence trip is interesting, but in places it has a wild beauty that is captivating. After reaching Toronto we spent a few hours seeing its handsome university, its Toronto and Trinity medical schools, hospitals, parliament buildings and its parks. There are two professors who while connected with the University of Toronto have

added to the medical knowledge of our age and are well known by their reputations to many medical men in the United States. These are James P. McMurrich, the anatomist, and Archibald B. Macallum, the physiologist. McMurrich now holds the chair of Anatomy in Michigan University. Macallum's research work has been quite extensive in the various departments of physiology. Among other discoveries he has made are those relating to the micro-chemistry of cells and the peculiar habits of phagocytic leucocytes of leaving the blood stream, entering the intestines, engulfing foreign substances and carrying these back into the blood with them. The important bearing that this must have on our conceptions of how diseases are caught is obvious. Had this work been done at the time we were in Toronto there would have been great temptation to have hunted him up and learned more about the matter. As it was we hurried away and took a boat for Lewiston from which point we inspected the gorge of Niagara River up to the falls. Here, of course, we went the usual rounds of seeing the suspension bridges, the Whirlpool, the interior of the Cave of the Winds, Goat Island, and taking the usual sail, immediately below the Falls, in the "Maid of the Mist." Having seen these sights a number of times before, and having looked upon them when enshrouded in ice and snow, the novelty was worn off, but no one can cease enjoying Niagara. When seen for the first time, many years ago, there were no electric plants nor other manufacturies drawing from its water as now. These take much of the charm away and as they increase in numbers the glory of Niagara will wane, if it does not finally disappear. It is but a few miles to Buffalo and that growing city is likely to draw increasingly on the power of the falls to run its machinery, light its homes, and propel its trolley cars. During the Buffalo Exposition all of the buildings on the exposition grounds were brilliantly

illuminated by electric power from Niagara. They looked like a bit of fairy land but while enjoying such splendor it was difficult to refrain from heaving a sigh at the lessened grandeur that this meant for the falls.

#### BUFFALO.

Every visitor to Buffalo is sure to be greatly impressed with its beautiful parks, its fine, broad boulevards, its "Front," its artificial lake with nearly four miles of path around it, its State Insane Asylum, and its city hall. Austin Flint was one of the founders of the medical college and John Dalton, "America's first professional physiologist," taught here.

#### UP THE GREAT LAKES.

From Buffalo we proceeded on the steamship "Northwest" for Duluth, Minnesota. Being July this lake route was deemed cooler than by rail. During much of the voyage overcoats were required. The Cleveland stop recalled a prior visit and an excursion to Put-in-Bay, where Perry won a victory over Britain. Did fate, accident, or miracle place there mines of strontium ore from which to procure fireworks of a lurid red with which to celebrate that and other victories, on July 4th? The beautiful, but small, crystal cave that is there is in the strontianite. It excels all other caves in this country for corruscating brilliance. On one of the islands is a mass of prehistoric Indian sculptures and, what is still more interesting, one of the most remarkable carvings of the ice during the glacial period, that exists in this or any other country. The rocks are fluted and polished as if designed for a cornice. Our next stop was at

#### DETROIT, MICHIGAN,

a handsomely laid out city on the Detroit River. Its streets radiate from two centers, intersected by others that form concentric circles to the centers. It contains four large

hospitals, as many dispensaries, one regular medical college, and its Belle Isle Park is very beautiful. In this city Dr. T. C. McClintock has recently worked out a method of producing autolysis among infecting gonococci. The State of Michigan has its medical school, connected with the university, at Ann Arbor, inland from Detroit. At this school a large amount of research work is being done in pathology, physiology, and anatomy. It was organized in 1850 and has students from many states in its classes. Citizens of the State have only a small matriculation fee to pay and a small annual fee of merely nominal amount. Those from other states have much larger fees to pay. F. G. Novy, associated with W. J. McNeal, lately accomplished an exceedingly important piece of work in discovering a method of artificially cultivating some kinds of pathogenic protozoa. In conjunction with Victor C. Vaughan he increased our knowledge of the ptomaines and quite recently these two have taught us much about cell toxins. J. P. McMurrich has added to our knowledge of invertebrate morphology and of anatomy. G. C. Huber has given us a lot of new information in histology, anatomy, physiology and embryology.

Leaving Detroit we sailed through lakes St. Clair and Huron to the straits of Mackinac, making a stop at Mackinac Island. Old Fort Mackinaw, near here, has been frequently battered about by the exigencies of war. At one time French, then English, then French again, then once more English, then American, then English again and finally American. Returning to the St. Mary's River our ship next proceeded to Sault Saint Maria where we had the pleasure of passing through what is claimed to be the largest canal lock in the world.

#### CHICAGO.

Had our ship not turned about at Mackinac we could have gone on down Lake Michigan to Chicago, a route previously

taken. This city is on so many railway lines from New York to the West that the writer is almost as familiar with it, by his frequent visits, as he is with New York. Its Jackson, Washington, Douglas, Garfield, Lincoln and Humboldt Parks, its Grace-land, Rose and Calvary cemeteries, its numerous monuments, fine buildings, hospitals, dispensaries, and medical schools and its universities are all of interest to visitors



NICHOLAS SENN, M D.

and nearly all very beautiful. So many visited it during the World's Columbian Exposition that it is quite likely that most readers of this communication have been there and that descriptions are almost superfluous. To know something about the Chicago physicians who have stamped the world with their seal of scientific research work is of far greater importance. The two best known among these are, probably, Nicholas Senn and John B. Murphy. As surgeons both have won wide recognition. Senn's bone ferrules, bone chips, and bullet probe, his method of treating intracapsular

fractures of the femur, fecal fistula, and cancer, of excising the shoulder joint, of fixing the kidney and of gastrotomy are well known. Murphy's "button" is quite familiar and he has added to our knowledge of the surgery of the gall-bladder, appendix, liver and of gun-shot wounds of the abdomen. L. Hektoen has supplied new facts concerning opsonins, lysins, isoagglutinins and of the relations of streptococci to scarlet fever as well as showing some important bearings of pathology to evolution. H. Gideon Wells has given us new information on chloroform necrosis of the liver, pathological anatomy of hydrozin poisoning, purin metabolism in fetus and placenta, chemistry of the liver in acute yellow atrophy, uric acid infarcts in kidneys of new born, the bearings of enzyme reversibility to pathology, the changes due to delayed chloroform poisoning, and anaphylaxis. G. Frank Lydston has improved the treatment of urethritis and of virulent conjunctivitis and has pointed out the evolution of local venereal diseases as well as the fact that disease is a part of natural selection. Byron Robinson, through writing and research, has greatly advanced our knowledge in anatomy, surgery and gynecology. A. P. Matthews has increased our knowledge of nerve irritability of the relation between solution tension, atomic volume, and the physiological action of the elements as well as supplying a suggestive working hypothesis for the study of cell mitosis. S. A. Matthews has shown us the effect upon the heart of experimental obstruction of the left coronary artery, and shown us the action of aconitia. W. L. Towers has given important experimental evidence of evolution, and Ralph S. Lillie has helped us along similar lines and toward a knowledge of the nature of parthenogenesis. These last two are not physicians.



## MADISON, WIS.

Our return from Chicago to renew our trip at Soo St. Marie is a reminder of another medical man who has added to the sum total of medical progress, and whose home is off our route. This is Charles R. Bardeen, of Madison, Wisconsin, who has increased human knowledge in comparative anatomy, experimental morphology, and human and comparative embryology.

## ST. PAUL AND MINNEAPOLIS.

On reaching Duluth we journeyed to St. Paul by train, passing over regions that, in a visit of former years, was covered with dense forest, but is now under cultivation. At our first visit St. Paul and Minneapolis were looked upon as far apart but now they are almost converted into a single, picturesque city. Here is one of the prettiest spots on the Mississippi. A sail from here to St. Louis, such as the writer took many years ago, must be now much more charming than it then was but the boat accommodations are probably not as good as at that time. Minnehaha was less of a "laughing water" than in the olden days and Fort Snelling seemed to have aged. Minnetonka Lake still bore much of its old beauty. Mills of various kinds had spoiled St. Anthony Falls and the village of St. Anthony was little more than a memory. We hastened away, after looking over the old sights, feeling that the destruction of natural scenery by growing civilization was, probably, on the whole for the best.

## YELLOWSTONE PARK.

An uninterrupted trip to Bismark brought us into North Dakota, the State in which Prof. H. L. Bolley is proving, experimentally, that disease is an exceedingly important force in plant creation. As our train sped through the "Bad Lands," and we saw the curious forms, like ruined castles, wrecked cities, unfinished monuments, and pictures of utter chaos and des-

olation, that the rocks had assumed, we tried to imagine how tempest and flood, followed by the spontaneous firing of exposed beds of coal, had wrought such havoc in the stratifications of ages. On reaching Livingston we changed cars for Cinnabar and at the latter station found the stage coach ready to carry us to Mammoth Hot Springs, in the Yellowstone National Park. This park is 55 by 65 miles in breadth and length and contains a total of 3575 square miles area. The Hot Springs are terraced with huge deposits of lime that has been given up from solution by the overflowing water. Tourists can have horse shoes and wire ornaments containing their initials encrusted with calcium salts to take home as souvenirs. Seeing the park by the usual route takes six days. A single fee can be paid that will cover staging and hotel bills. There are hotels for night stops and camps for noon lunches. It is cold at night and usually hot and dusty during the day. Ice, snow, and boiling springs lie within a few feet of each other in many places, so that they can be touched almost simultaneously. At two places, en route, a man can catch fish and, without moving, dip them by a swing of his line into a nearby boiling spring and cook them. At the Divide the tourist can touch water that is flowing toward the Pacific Ocean and the Gulf of Mexico; to the right of him for one and to the left of him for the other. At the Obsidian Cliff, roads are crossed that are made of broken black glass which nature made. Near by are the dams that beavers have built. Part of the road is over a pass of more than 7000 feet in altitude, with snow clad peaks always in sight. The geysers are supposed to exceed in interest those of Iceland and of New Zealand. Old Faithful is always to be depended upon to spout. The Grotto Geyser if given time will display itself. Some of them, however, cannot be relied upon and may or may not show what they can do when being watched. The Paint Pots and Mud Geysers are interesting. Some of the

native bears have become so tame that tourists get near enough to photograph them. No one is allowed to injure the animals of the Park. There are myriads of wild flowers that are marvels of beauty. A steamboat sail on Yellowstone Lake adds variety to the method of travel. The Grand Canon of the Yellowstone, its superb falls, its brilliantly colored rocks and sands, its isolated pinnacles each of which has its eagle's nests, and its surrounding scenery, are magnificent. So captivated were we with the region that we lingered a week at the Canon Hotel. In Heyden Valley is a small herd of American buffalo that were a sad reminder of the thousands seen during the writer's boyhood trip across the overland trail in 1862.

#### ALASKA.

Returning to Livingston by coach and train we resumed our journey westward through Montana, Idaho and Washington. At Tacoma we found the tourist steamer 'Queen' ready to receive us for a twelve days' trip to the beauty spots of Alaska. As in Norway, almost the entire route is protected from rough weather by island barriers. It is like sailing on rivers rather than on the sea. Islands of all sorts, sizes and kinds are passed making a perpetual panorama of changing beauty. Though much less imposing than the Norwegian fjords these have a charm of their own that is alluring. As the weather was a mixture of pouring rains and rifted clouds, through which the bright sunshine occasionally gleamed, we saw cataracts in profusion. A dozen could be seen, within an hour, pouring down from great heights into the sea. As our ship swept into some narrow bays the salmon were crowded before her in such numbers that they seemed to be walking over each other. On the shores, at some of the landings an attempt at botanizing showed the ground to be covered so deep with moss that the feet would sink out of sight into it. Trees, houses and

roofs of all kinds had their coats of moss that attested continuous rainy weather. The harbor of Sitka looked to be exceedingly beautiful. Juneau had a pretty position but was less attractive. Metlacatla interested us greatly because of its history, its salmon canning industry, its mission, and its people. The Muir Glacier was the sight of sights to all the passengers. Here were immense icebergs in the making before our eyes. Our ship had to keep at a respectful distance or they would quickly have sent her to the bottom of Glacier Bay. A trip to the summit of the glacier gave us lessons in regelation, earth carving, moraine depositing, the treachery of crevasses, etc., that were more impressive than our readings of Tyndall. We learned of the immense coal deposits on the many islands passed, of the gold mines that had yielded treasures of great value, and of the rich farming and pasture lands that await future pioneers and wondered if Russia did not regret her lack of forethought when she sold all these to us for such a trifling fraction of such wealth. At Victoria, Vancouver's Island, we received a British welcome that made us feel that Johnny Bull is not so bad a neighbor after all. Following an inspection of the interesting things around Seattle and Tacoma, and after getting a peep at superb Mount Rainier we proceeded by rail to Portland, Oregon. This is the one State that Horace Greely excepted from his advice of, "Go west, young man. Go west."

## ACROSS NORTH AMERICA—EAST- WARD.

The last touring letter left the Fortnightly readers at Portland, Oregon. Here we had expected to get a superb, inclusive view of Mounts Hood, Rainier, St. Helen's, Jefferson, and Adams, but the air was so hazy from forest fires that our hopes were blasted. To atone for this loss we took a trip up the Columbia River as far as Hood River, in order to see Mount Hood at closer range, to see the scenery of Columbia River and to observe the way that salmon are caught in that region. On our return we spent a very enjoyable day driving to Willamette and Portland Heights, to Vancouver and to the various public buildings, hospitals, and medical school. The railway journey from Portland to San Francisco is a long but interesting one. We broke it at Castle Crag and at Sacramento and would liked to have stopped at one of the way stations between Edgewood and where we first crossed the Sacramento River, but our arrangements would not permit of it. To our fancy there is no more wildly beautiful spot in America than this. Majestic Mount Shasta looms up in regal splendor with its diadem of snow. The train, in climbing the mountains, makes a number of loops upon itself where many miles of magnificent valley, crag, precipice, gorge, and mountain scenery sweep successively into view with awe inspiring grandeur. The Swiss-like appearance of the region around Castle Crag Tavern and Mossy Brae tempted us to linger beyond our allotted time, and thus to shorten our stop at Sacramento City. In the latter the writer had been before but it was new to

Mrs. E., and being the place where gold was first discovered in California she wished to see it.

#### SAN FRANCISCO.

At San Francisco, in common with most tourists, we put up at the Palace Hotel, making it our headquarters while exploring the various points of interest in the rest of the State. Never had that city seemed more captivating to me than on that occasion. Its "Nob Hill," its parks, its palatial homes, places of business, and public buildings appealed, even to the eye of a New Yorker, as worth a long trip to see. Its weird Chinatown, its Sutra Heights and gardens, and its Seal Rocks were sights that could not be duplicated in any other part of our country. We wearied ourselves drinking in the enjoyment that they brought and after successive trips to Oakland, to Berkeley, to Palo Alto, to San Jose and Mount Hamilton Observatory, to the Yosemite Valley and the Big Trees, and to other surrounding points of attraction we were always ready on our return to take fresh turns at seeing the sights of San Francisco again. Golden Gate Park was particularly enticing. Its Strawberry Hill with Huntington's Cataract, its Japanese village, its Egyptian palace, its aviary, its Drake Cross, its Panorama building, its children's play houses, its flowers, called us back at each return to take other glimpses of them. When we finally turned our faces homeward we wondered how long it would be before we could see them again. Little did we think of what was soon to happen to all that beauty. It never occurred to us that when we should see it again, as we did on our arrival from Japan, on our perit-errestrial tour, that its magnificent "Nob Hill," its fine public buildings, its Palace Hotel, and its streets of princely stores, would loom up as ruined, blackened skeletons mocking their former grandeur. When we next visited its peerless Golden Gate Park the neglect was so pronounced

that it saddened us. One other city we had, in the meantime, used, as we did San Francisco, as a center for our touring. This was Messina. From it we took our various trips through Sicily and when we left it for the last time there was no thought of its early destruction in our minds or that the friends we had made there would soon be numbered with the dead—crushed into eternity by falling homes. Bret Harte was right, for

"The ship sailed safely over the sea,  
And the hunters came from the chase with glee,  
But the town that was builded upon a rock,  
Was swallowed up in the earthquake shock."

California is young and its early life was a strenuous one. It had small opportunity for cultivating science until quite recently but has made good use of that which it had. In San Francisco A. J. Lartigau has added to our knowledge of the bacteriology of gall-stones, and of adenoid tuberculosis; W. Ophuls of mold infections, amyloid degeneration, edema, and tuberculosis; J. M. Flint of the comparative anatomy of the intestines, lungs and joints; A. E. Taylor of enzymes, cytolysis, albumin synthesis, conditions favoring bacterial growth, and in other important directions. In Berkeley H. B. Torrey supplied new information on regeneration; J. B. McCallum on the histology of muscle, internal secretions, Wolfian bodies, and saline purgation; W. V. Osterhaut on cytology; and Jacques Loeb on electrolytes in living matter, artificial parthenogenesis, and comparative physiology of brain. In Santa Rosa Luther Burbank has solved some puzzling problems of embryology through experiments in hybridization. In Oakland J. T. Gulick resides who, in the Hawaiian Islands, discovered a number of important facts in evolution. In Leland Stanford, Jr., University, at Palto Alto, President D. S. Jordan and V. L. Kellogg have taught us among other important facts the value of isolation in the origin of species, while F. M. McFarland and R. E. Swain have added to our knowl-

edge of cytology, histology, tryptic digestion, uric acid, and other features of physiology. On Santa Catalina Island, not far from Los Angeles, there is a biological station for experimental work on regeneration, teratology, evolution, etc. Visitors there enjoy sailing in the glass-bottomed boats where they can look down into the sea-depths and study marine plants and marine animals under normal conditions of life. The sight is at once beautiful, interesting and instructive. Before going to Santa Catalina, however, the tourist should take in the Yosemite Valley, on the way southward from San Francisco. This remarkable ice-cut gorge, like the fjords of Norway, is a reminder of the glacial epoch. Its Bridal Veil, Yosemite, Vernal, and Nevada Falls once seen are not likely to be easily forgotten. Its Mirror Lake, reflecting back the cathedral dome, and the views from Artist's and Glacier Points, with the tremendous precipice of the latter, make the onlooker feel the insignificance of man in contrast with the greatness of nature. The gigantic Sequoia trees, usually seen on the return trip from the valley, constitute one of the natural wonders of the world. The immensity of their size always elicits astonishment when seen in contrast with objects of known dimensions, but if only compared with each other it is impossible to have any adequate realization of their magnitude. To the visiting botanists their great age and the geological antiquity of the genus constitute their chief interest. Fossil remains, that have been found in different parts of our northern hemisphere, tell us that these are but a small remnant of a once widely scattered tree and that it existed in great forests where now we have Greenland's icy mountains and Spitzbergen's frozen land. The cone of the Sequoia seldom exceeds an inch and a half in length but the sugar pine, that grows in the same region, has cones that are ten to fourteen inches long with corresponding width. The largest Sequoia that has been



found was 143 feet 5 inches in circumference at the base. There are over twenty of them in Calaveras grove that exceed 78 feet in circumference and 25 feet in diameter at the base. As most city houses are about twenty feet in frontage it is evident that a sawed-off section of any one of these twenty trees would make a larger dancing floor than the parlor of the average house, with the hall partition wall removed. One such tree contains about half a million cubic feet of building lumber. The red-woods, out of which most California lumber is cut, are a smaller species of Sequoia, and some very fine buildings of San Francisco and Los Angeles have been built entirely of lumber from these. The last named city now rivals San Francisco in beauty and being farther south its wealth of tropical vegetation and pretty gardens make of it a desirable stopping place for the tourist. Near it are many places of interest, such as Rodonda Beach, Santa Barbara, San Diego, Coronado Beach, Mount Lowe, San Bernardino, and the numerous orange groves.

#### ARIZONA, COLORADO AND NEW MEXICO.

After seeing these and visiting some of the princial points of sentimental attraction, in connection with the captivating story of Ramona, the writer bade good bye to California and sped eastward through Arizona and New Mexico. At Tucson, Arizona, is the Desert Experiment Station where D. T. MacDougal, C. S. Gager, B. E. Livingston, and others have succeeded in adding to our knowledge of heredity, the reactions of protoplasm to poisons, and some of the laws governing evolution. Livingston's experiments bid fair to enlighten us on how drugs act as curers of disease, although he had no such object in view when performing them. One drawback to Tucson, for the average tourist, is its remoteness from the great sights of that territory that every visitor desires to see. The Grand Canon of the Colorado is in the north while Tucson is almost at the

extreme south. If one or other has to be given up it is not likely that the canon will be that one. Its overwhelming grandeur and overawing vastness surpass anything of the kind that can be seen elsewhere on our planet. It is to canons what the Himalayas are to mountains—the unsurpassable. To study its surroundings and thus convince ourselves of the method of its carving, is to begin, for the first time in our lives, to realize, in a small way, the almost eternal age of our world. Seeing the figures, as so many millions of years, makes about as small an impression upon consciousness as water does on the back of a duck. Seeing from 4,000 to 7,000 feet of almost perpendicular walls that have been worn through by the river's flow as the land was slowly raised to ever-increasing heights all but staggers credulity. The stratified rocks down to the granite bed have been gnawed through by the water's rush of ages. The shifting of the river from time to time while accomplishing this tremendous task, has carved out strange forms that are likened to Hindoo temples, great spires, mountain domes, and the like, while the many shades of the rocks from browns, through yellows, to deep reds have left everything painted as if by a frenzied god. All of this lies far away below the observer's feet, and when he first comes upon it the astonishment is indescribable. Imagining himself on the true surface of the land to thus, suddenly, find that he is on the very summit of a high mountain, is most startling. It takes some time to even partly reconcile one's self to the stupendous contradiction of feeling that it evokes. The highest peaks of the White Mountains, if dropped into that tremendous gorge, would, in places, fail to reach to the height of the feet of the on-looking tourist, providing their bases were trimmed so as to permit of being lowered therein. There is no evidence, anywhere, that any part of this gorge resulted from earthquake rupture or other such violence. The granite bed and

all the markings tell only of water erosion. The mesas, on the surface land, tell a story of still greater antiquity that helps confirm the record of the river's work. Among these mesas are many things of such enticing interest that the scientific traveller lingers long there after the average tourist has departed. The home of the Mochi Indians, the ancient homes of the Cliff Dwellers, the petrified forest, and the prehistoric carved rocks, are among these. To describe what we saw of this character would over-reach the purpose of this letter, as would also descriptions of New Mexico, Colorado, and Utah scenery, through which we passed. The Royal Gorge, in the canon of the Arkansas River, should not be passed without being visited as it is one of the great sights of our country. The Garden of the Gods and Pike's Peak are sure to attract those who visit Denver. The scientific tourist should not miss going to Florissant which is not far from Colorado Springs. In the neighborhood of Florissant is a region that was buried ages ago in about the same manner as Pompeii. T. D. A. Cockerell, of Boulder, Colorado, has spent considerable time studying this region, and among the other important and interesting finds are some tsetse flies which were buried in the volcanic ashes and preserved so perfectly that we now know that the fly once existed in America. Along with it also existed here camels and other animals common to Africa. Some terrible catastrophe swept whole species of the animals of that time entirely out of existence on this continent. Prof. Cockerell hints at the possibility of the tsetse fly being the wholesale destroyer of that age. Although Prof. Cockerell is not a physician he has cast a side-light on medical matters by his study of evolution. As early as 1897 he called attention to the fact that disease must be a factor in natural selection. Among the physicians of Colorado who have contributed to the progress of medical science the one known

to the writer from his writings is Henry Sewall, of Denver, whose contributions to physiology and on Safeguards of the heart beat, as well as thoracic aneurism, have been important. Denver City is so well known to almost every one who has gone west that its description seems almost superfluous. Its most particular feature is its situation on the plain so near the Rocky Mountains. Every view towards the west is a mountain view and on looking eastward only a plain is in sight which, but for its low uneven hills, would, as in Illinois, carry the vision to the horizon. In clear weather the westward view shows Long's, Gray's and Pike's Peaks looming up skyward to altitudes of more than 14,000 feet. At a distance of 150 miles to the south-west can be seen the usually snow-clad summit of Pike's Peak. After having gone to the top of that mountain, on the cog road, from Manitou, it is interesting to look up at it from this remote point and to compare the labored breathing at the high altitude with the easy rhythm of heart and lungs in Denver. Upon the mountain the slightest effort makes the traveller gasp for breath and, on first experiencing it, fear that some sort of disease has taken possession of the lungs. An attempt at boiling an egg or some potatoes at that high altitude soon reveals what the real trouble is. Neither can be cooked enough so as to be fit to eat no matter how long the boiling is continued. The atmospheric pressure is so small that the water boils violently when barely hot.

#### MISSOURI.

Between Denver and the Missouri River all the exciting experiences of Indians, elk, and buffalo have disappeared. Even the prairie dog, the coyote, and the wild turkey are vanishing. Cities and villages have come to take their places, and where these plains were once swept with fierce fires of dried autumn grass, cattle safely graze within fenced pastures. No more do

Pawnees, Shawnees, and Shoshones contend with each other for the mastery of hunting grounds and the begging scarecrows, that occasionally appear at way stations to see the passing train, are but a sad reminder of the stately warriors whom, as a boy, the writer feared and respected. Once past the Missouri and there is nothing, save names, to recall the miles of untilled and unoccupied land that lay too far from a river to be considered worth pre-empting. The passenger steamboats that plied between Omaha and St. Louis, with Kansas City (Westport landing) between, are now but a memory. Railways have taken their places and made possible the building of an empire out of the neglected solitudes. Fortunes have been made and lost in land speculations. The unearned increment made many rich while the increment that disappeared with shifting populations and abandoned sites made as many poor. A law that would tax away the former should, in order to be just, restore the latter. In Kansas City far more was lost than gained, but the hideous looking masses of loess were levelled at the cost of many a destroyed nucleus of a fortune; and a most unpromising looking region converted into a city of palatial homes. About midway between Kansas City and St. Louis is Columbia, Missouri, the site of the State University. Here some very promising work is being done for the advancement of medical science. C. W. Jackson has extended the boundaries of our knowledge in comparative anatomy and histology; Geo. Lefevre has given us new information on artificial parthenogenesis, regeneration, tissue grafting, and embryology; C. W. Green has taught us new facts about the osmotic pressure of the blood, and of the influence of inorganic salts on cardiac tissues; E. M. Dugger has cleared up some mysteries of plant resistance to disease; and P. Paquin gave to the English-speaking world its first journal of bacteriology.

## ST. LOUIS.

A few hours railway ride from Columbia brings the traveller to St. Louis, the metropolis of the Mississippi Valley. Its three terraces, extending from the river front to the bluff at Cote Brillante, together with the numerous hills beyond, give it a most attractive appearance. Its Forest Park, its Tower Grove Park, its Shaw Botanical Gardens, its beautiful cemeteries, and its numerous small parks make it a delightful place to rest and enjoy oneself, particularly in the spring, and its long Indian summer, which lasts from mid September to Christmas. The visiting medical man can find an embarrassment of attractions in the form of medical colleges, hospitals, and dispensaries. Of the first named there is the Washington University Medical Department, the medical department of St. Louis University, the College of Physicians and Surgeons, and the Barnes Medical College. St. Louis has long held a prominent place as a center of medical education. The first faculty of medicine was that of the St. Louis University, of the Society of Jesus, and was chosen in 1836. Four years after this the medical department of Kemper College, later known as the Missouri Medical College, and now as the medical department of Washington University, gave the first course of medical lectures, the other organized faculty having failed to start their classes. Because of the prominence of J.M. McDowell in managing of the medical department of Kemper College, during the first decade of its existence, it was locally known as "McDowell's College." He, and C. A. Pope, were the earliest prominent surgeons of the Mississippi Valley, while M. S. Linton and J. S. Moore occupied similar prominence as internists. The latter won national fame by his results in using calomel in treating cholera during the epidemic of 1849. The St. Louis Medical Society was organized some time between 1830 and 1837, and it was chartered

in 1837—it antedated the state society by about fifteen years. Among the charter members B. G. Farrar, H. Lane, J. Johnson, H. King, C. J. Carpenter, H. McCabe, B. B. Brown, and Y. D. Boling are mentioned in the act of incorporation, while among its early members was Wm. Beaumont who won world-wide fame through his experimental work on digestion. In 1822 a young man named Alexis St. Martin was wounded by the accidental discharge of a gun at the distance of about three feet from his body. Among other injuries was a perforated stomach. He came under the care of Dr. Beaumont and when he had recovered it occurred to the doctor that this would be a good case in which to study human digestion, inasmuch as, in defiance of all treatment, there was established a permanent gastric fistula of about two and a half inches in circumference. In 1825 Beaumont took St. Martin into his employ as a servant using him for the study of digestion for eight years. The results thus obtained constitute the first scientific knowledge the world had on the subject. So well was the work done that little had been added to our knowledge until a Russian named Pavlov—whose name American authors persist in Teutonizing into Pawlow—with in recent years greatly extended it. The next important piece of scientific advancement for which the world is indebted to St. Louis was the devising of the Hodgen splint by J. T. Hodgen. It revolutionized the method of caring for hip and thigh fractures. In medicine, botany and meteorology G. Englemann brought honor to the profession. As the one thorough pioneer botanist of the West, and as the earliest of American students of meteorology he greatly aided phylogenetic botany and was the forerunner of "Old Prob." To C. Michel we are indebted for medical electrolysis which he employed successfully in connection with the eye, while Hardaway developed its use in dermatology. To E. J. Switt must be credited some recent

knowledge of eye defects in children, neuroses of childhood, and the bearings of psychology on heredity. To E. P. Lyons we owe recent knowledge concerning physiological compensatory motions, tropisms in cell functioning, the cyanides and oxygen respiration, and the effects of lack of oxygen. H. von Schrenk has advanced our knowledge of phyto-pathology. As an early



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foretaste of new methods in instruction which the St. Louis leading medical schools have inaugurated are the first-fruits from Guthrie and McGuigan. If C. C. Guthrie's work on ovary transplantation proves flawless, under repetition by others, it is epoch making. It definitely settles a long-standing, fundamental, and exceedingly important dispute on heredity. H. McGuigan has supplied us with experimental evidence of the direct utilization of the common sugars by the tissues and has given us new facts concerning glycolysis that will greatly aid us in solving the problem of the etiology of diabetes.



## ILLINOIS.

In going eastward from St. Louis, by the Wabash, the passenger passes within easy distance of the State University of Illinois, at Urbana. Here H. B. Ward has recently become a teacher. To him we are indebted for a large amount of information concerning parasites and parasitism, particularly in regard to metazoan parasites. He has done much in the way of helping us to a knowledge of the relationship between animal and human parasitic diseases. Here G. T. Kemp isolated some poisons of pathogenic bacilli, studied the influence of curare on muscle metabolism, taught us the relation of blood-plates to hematogenesis and to coagulation, and the effects of altitude on the blood. Here H. S. Grindley extended our knowledge of the proteins of meat and S. A. Forbes taught us new facts about the diseases of insects.

## KENTUCKY.

Exclusive of scientific interest there is nothing likely to hold the tourist here long while a detour to the southeast, via Louisville, will carry him toward the Mammoth cave of Kentucky—the largest known cave in the world. On the way Wyandotte cave might be included but the writer never having visited the latter is unable to describe it. In passing through Louisville the medical visitor should recall the fact that S. D. Gross, the well-known surgeon, taught here for a short time and that it was here that he performed his experiments on wounds of the intestines. About as far to the southeast of Louisville as the Mammoth Cave is to the southwest, lies Danville the old home of Ephraim McDowell, "Father of Ovariectomy," where he performed the first successful ovariectomy on a Mrs. Crawford of that place. In McDowell Park, Danville, the Kentucky State Medical Society erected a monument to his memory on which appear the words: "Honor to whom honor is due." Connected with the

Mammoth Cave, at a period not remote from the time of McDowell's success, a melancholy effort was made at trying to cure pulmonary tuberculosis by residence therein. Away from sunlight, through a passage guarded by myriads of bats, credulity buried the living victims of a disease that needed, above all else, light and free air. Buoyant hope made some of them think this immurement was benefiting them, but after the sacrifice was sufficiently great to convince the most stupid, the "sanitarium"—save the mark—was abandoned. This cave is a huge affair and has been explored to a distance of ten miles from the mouth while its zigzag paths and passages measure nearly 150 miles. It requires two days of travel to see only the chief points of interest, but the intervening night is spent at the hotel outside the cave. To the biologist the blind fish and eyeless crustaceans are among the most interesting things there. The atrophied spots that mark the places where seeing eyes once existed in their progenitors, and that now exist in their nearest of kin, tell a wonderful tale of reversed selection through lack of use. They also suggest how great must be the antiquity of that once subterranean river. The water has not all gone from there as the visitor discovers when he has to be ferried over Echo River in a boat and when he passes the River Styx, Lake Lethe, and the Dead Sea. Some of the chambers are of vast proportions, the famous Star Chamber being nearly 500 feet long, 70 feet broad and with a ceiling 70 feet high. The highest domes exceed this greatly in height, Lucy's Dome being nearly 300 feet to its top. Stalactites and stalagmites of grotesque forms, numerous sizes and curious combinations are abundant, but are found only in special parts of the cave. While they are very interesting and very beautiful they lack the cleanness and fairy-like combinations of colors found in those of Luray Cave, Virginia.

## CINCINNATI.

The trip from Mammoth Cave to the Shenandoah Valley, with its Natural Bridge and Luray Cave, if taken by way of Cincinnati, will give the medical tourist a chance to see another of the places where S. D. Gross taught anatomy. It was in this city that he gave the first systematic course on morbid anatomy ever delivered in the United States. Here too Daniel Drake wrote what Dr. W. H. Welch calls the "Monumental Work on the Diseases of the Interior Valley of North America." Willard Parker taught surgery in this city before going to New York. In our own day J. U. Lloyd here advanced our knowledge of the alkaloids, glucocides, and other active principles of medicinal plants, and H. Ayers our knowledge of vertebrate morphology. Cincinnati contains many hospitals and dispensaries. Its City Hospital has been referred to as one of the largest in the world. It has three medical colleges and many handsome public buildings.

## CIVIL WAR SCENES.

The trip from there eastward takes the traveller through some interesting mountain scenery. At Shenandoah Valley Junction, if the journey is made on the "B. & O.," the tourist finds himself in one of the great historical regions of the civil war. Gettysburg is north of him, Bull's Run southeast, and Harper's Ferry, the scene of John Brown's celebrated raid that cost himself and sons their lives, is in easy walking distance. About 50 miles southwest, on the Shenandoah Valley Railway, lies Luray and about 75 miles farther, on the same road, is the celebrated Natural Bridge of Virginia. Luray cavern should not be missed by any traveller in that region as it is—incomparably—the most beautiful of stalactite deposits yet discovered. Natural Bridge figures so conspicuously in our school books that everybody knows about it. The gorge it crosses is 215 feet deep and 60 feet wide with a road on the top.

Botanists will be interested in the walking ferns found below the bridge.

#### WASHINGTON.

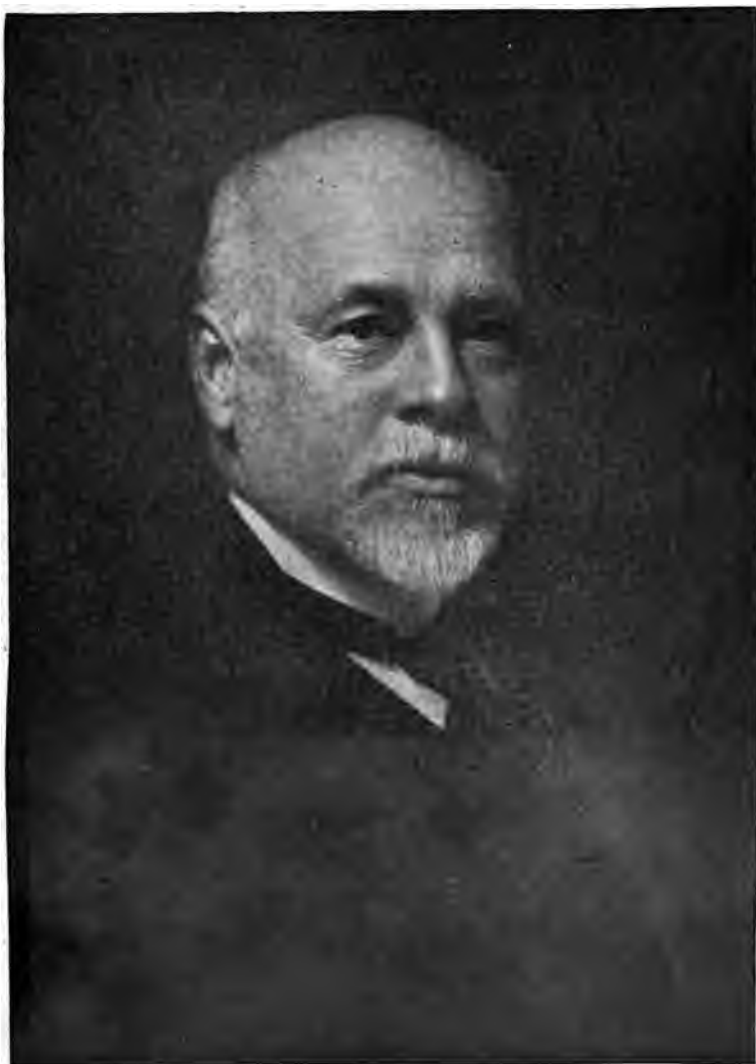
The run to Washington only consumes a few hours. There the chief among the sights are the Capitol and the Congressional Library. The latter is the most beautiful building in our country and is a composite of several Parisian places of note. The Washington Monument, Treasury Building, State, War and Navy building, Corcoran Art Gallery, Bureau of Engraving and Printing, Smithsonian Institution, National Museum, Agricultural Building, Fish Commission Building, Botanical Gardens, and a trip to Mount Vernon, to see the home of Washington, make an itinerary that gives a good idea of the place. The hospitals, asylums, and public homes will, of course, be seen by the visiting physician. Washington has drawn men of culture from all parts of the United States and its residents have therefore done much, in the regular line of their official duties, or through independent initiative, for the promotion of medical knowledge. From here G. M. Sternberg directed the researches of W. Reed, J. Carroll, A. Agramonte, and J. W. Lazear when they, experimentally, revealed the part played by mosquitoes in yellow fever. Here was W. C. Gorgas, headquarters when, in Cuba and the Canal Zone, he subdued yellow fever. Here Walter Wyman, by skilful management of the Public Health and Marine Hospital Service, has abetted research and given several practical lessons in sanitation. Here D. E. Salmon and Theobald Smith, as already mentioned, made the world their debtors by the discovery of the relationship of toxins to immunity. Here C. W. Styles advanced our knowledge of protozoon diseases and of hook-worm disease. Here L. O. Howard extended our knowledge of the "typhoid fly" and of the malarial and yellow fever mosquitoes. Here Reid Hunt worked out a standard for thyroid extract and increased

our information regarding the physiology of the cardiac nerves and of the suprarenals. Here J. H. Kastle taught us many new and important things about lipase, invertase, and oxidases. Nearly twenty years



G. M. STERNBERG, M. D.  
WASHINGTON

ago A. F. A. King here solved the problem of the relationship of malaria and mosquitoes, but we refused to give heed to his evidence until England had won the glory from us by research of another kind. Indirectly medical science has been aided by the rediscovery of Mendel's law by W. J. Spillman of this city and he, F. O. Cook, W. A. Orton, A. F. Woods and H. J. Webber have extended our knowledge of phyto-pathology and evolution.



W. H. WELCH, M. D.

President, American Medical Association, 1910-11.

## BALTIMORE.

In crediting the yellow fever triumph to denizens of Washington it should not be forgotten that Sternberg, Reed, Lazear and Carroll were students of W. H. Welch, of Johns Hopkins University, Baltimore. Nor should the fact be overlooked that Dr. Welch has been to American medical progress what Johannes Muller was to German biological development. The astonishingly large number of his pupils who have won distinction, and fill places of responsibility and honor, is the best evidence that could be asked for of the great work he has done and is doing for American medicine. Aside from this, however, he has, personally, supplied us with new knowledge in bacteriology, pathology, and physiology. Among the most important of these is his work on thrombosis, embolism, surgical infections, fevers, glomerulo-nephritis, diphtheria, loss of bacteriacidal power of the blood, why bodies decompose rapidly after snake poisoning, and the discovery of the pathogenic organism *Bacillus aerogenes capsulatus*. To him we are indebted for the first American Journal of Experimental Medicine. His colleague, W. H. Howell, has among other important discoveries given new knowledge of the proteids of the blood, the mechanism of sleep, the cause of the heart beat, the origin of red cells, the relation of inorganic salts to the heart beat, and nerve regeneration. Before moving to New York W. G. McCallum gave the first clue to the nature of the supposed "flagella" in halteridium, thus making Ross's discovery of the malarial parasite in the mosquito possible, showed us the relationship between calcium metabolism and tetany, and in various ways advanced our knowledge of protozoology and bacteriology. H. A. Kelly introduced the operations for nephro-ureterectomy and uretero-ureteros-tomy taught a new method of catheterizing the uterus and in a number of ways advanced gynecology. H. P. C. Wilson was

the first gynecologist in Baltimore, was the first in Maryland to perform Sim's operation for division of the cervix uteri, and to remove the uterine appendages by abdominal section. "He was the second physician in the world to remove, by cutting into



H. A. HARE, M. D.  
PHILADELPHIA

pieces, a large intra-uterine fibroid tumor filling the whole pelvis." The patient recovered. It was in Baltimore that John Crawford, in 1807, first declared that malaria was carried by mosquitoes. Other Baltimoreans who have helped us along the road of medical progress through research are W. S. Thayer on the heart and blood in acute diseases., F. P. Mall on the structure and embryological development of vari.



ous organs and on human monsters, H. Cushing on the function of the pituitary and in bacteriology, E. A. Andrews on leucocytes, E. L. Mellus on the anatomy of the central nervous system, W. H. Lewis on the embryology of eye, arm, head, etc., P. W. Dawson the regeneration of nerves and L. F. Baker on the chemistry of proteids.

#### PHILADELPHIA.

Every visitor to the eastern seaboard is as anxious to see Philadelphia as he is to see Washington or New York. All have heard of Independence Hall and its collection of memorials of the dawn of American Independence, of the old Penn Hospital of 1755, of the Betsy Ross house where the first American flag was designed and made, of the old Livesey house where Washington had his headquarters, of William Penn's house, of Benjamin Franklin's tomb, of liberty bell, of Fairmount Park, of the Wisahickon, and of the numerous beautiful public buildings, colleges, churches, and hospitals. All desire to see where the declaration of Independence was signed and to visit the various places made attractive by their connection with the early history of our country. Visiting physicians will remember that one of the signers of the declaration of independence was Benjamin Rush, professor of chemistry of the Philadelphia Medical College, and afterwards professor of practice in the same institution. He was the first to insist on the fact that yellow fever is non-contagious and he added more new facts to medicine than all who preceded him in this country. Philip Syng Physic, another of the professors, was "the father of American surgery." S. G. Morton, of the next generation, was, probably, the most thorough anatomist of his time. W. E. Horner, successor of Dr. Physic, added to our knowledge of anatomy and histology. J. Leidy, a student of Horner's, added very materially to our knowledge of comparative anatomy and was the first to distinctly declare that flies carry

germs. S. Weir Mitchell discovered new facts in nervous pathology and the nature of venoms. H. C. Wood has given us new facts in pharmacology, therapeutics, nervous diseases, and sunstroke. C. E. de'M. Sajous has been a prolific writer and has advanced our knowledge in internal secretions, hay fever, and diseases of the nose



J. H. MUSSER, M. D.

and throat. H. A. Hare has taught us many things about drug therapy and of the effects of drugs on bacteriolysis. Leo Leob has hepled us to our knowledge of myocarditis, growth of epithelium, edema, and relation of ovaries to decidua. J. H. Musser has advanced our knowledge of post-operative tetany, enlarged prostate, carcinoma of the stomach, the Cammidge reaction, etc. E. H. Goodman was associated with Dr. Musser in his work and has given us new information concerning the physiology and pathology of the saliva, the Solomon test in carcinoma of the stomach, the Cammidge

reaction in lesions of the pancreas, and on diabetic acidosis. Horace Jayne has extended our knowledge in comparative anatomy. G. A. Piersol has developed new facts concerning the embryology of the sense organs, the origin of lymphoid tissues, and the etiology of monstrosities. A. C. Abbott has carried us into new facts in the fields of infection and immunity. A. Stengel has taught us new things about diseases of the blood and of the heart. M. P. Ravenel has shed new light in some dark places in comparative pathology, tuberculosis and immunity. T. H. Montgomery, though not a physician, has increased our knowledge of cell mitosis and given us new ideas in phylogeny. It is thus evident that Philadelphia is alive to the interests of humanity and the most approved ways of advancing the same. As early as 1847 she showed us this spirit of progressiveness by organizing the American Medical Association with Nathaniel Chapman as its first president.

#### NEW ENGLAND.

Before ending our tour of where North American medical science is now growing we must not forget New England. In going thither a stop at Princeton, Menlo Park and Rahway, New Jersey, will bring us to where E. G. Conklin discovered some most important principles regarding the differentiation of the egg in its development, where T. A. Edison aided medicine in developing skiography and the electric light for diagnostic purposes, and where E. M. Moore was born. Moore was one of the founders of the American Surgical Association, advanced our knowledge of the treatment of fractures, of the physiology of the heart's action, and of blood transfusion. His principle research work was done in New York State. As a well known Philadelphia physician, G. M. Gould, has recently moved to Ithaca, in that state, and as some research work has been done there that should be recorded, a short detour in that direction will be of interest, particu-

larly as it will give the visitor a chance to see nearby Watkins' Glenn, one of the chief beauty spots of New York State. Gould has greatly aided American medical progress by his year-books and other literature as well as by his studies of diseases of the eye. It is in Ithaca where B. G. Wilder has prosecuted his extensive studies in anatomy, and particularly the anatomy of the brain, and in morphology. Here P. A. Fish has advanced our knowledge of comparative physiology, S. H. Gage of histology and embryology, and G. F. Atkinson of phyto-pathology.

Leaving Ithaca we will go direct to New Haven, Connecticut. A number of railway routes may be chosen all of which the writer has travelled upon but, for present purposes, an automobile ride would be appropriate if not so expensive. The doctor's auto has become possible because of the labors of a man born in New Haven. Without rubber tires it could scarcely have been made a success and the hardening of rubber for tires, drainage tubes, irrigating fountains, syringes, pessaries, supports, and numerous instruments used by medical men we owe to Charles Goodyear. Mocked and made fun of as a silly dreamer, imprisoned for debts incurred in his work for humanity, robbed right and left after his success, such was the reward of this Connecticut inventor. It was in New Haven that Nathan Smith founded Yale medical school and invented a number of surgical instruments, Nathan Ives first administered chloroform for asthma, croup and atonic quincy, Jonathan Knight first treated aneurisms by compression, and W. O. Atwater showed us how to study nutrition scientifically. At present R. H. Chittenden is extending Atwater's researches and giving us much information concerning enzymes and metabolism. T. B. Osborne is revealing the nature of proteins—an epoch-making piece of work, and has helped us toward the solution of the thyroid function, O. T. Osborne has cleared up problems of

acromegaly, organic extracts and blood diseases, L. B. Mendel those of excretion and nuclein metabolism, and W. R. Coe of embryology. In near-by Middletown, H. H. Conn has helped solve problems of evolution and bacteriology.

#### BOSTON.

In going to Boston, Plymouth Rock, where the Mayflower landed should be visited. At Plymouth Samuel Fuller was the first physician of the pilgrim fathers. What would he have thought had he visited Boston at a later date and seen J. C. Warren give the first anesthetic in surgery or perform the first operation for strangulated hernia? Imagine his feelings at hearing Oliver Wendell Holmes, as a sympathizer with Semelweiss, denouncing the dirty hands of obstetricians as the cause of puerperal septicemia, or Asa Gray in a heretical defense of Darwin. Could he have been present at the founding of Harvard by John Warren and seen its first home and then came later to see those jewels of Greek beauty—the modern Harvard medical buildings, he would have been compelled to think that civilization does move upward. The clear cut medical philosophy of Jacob Bigelow, a look at the experimental work going on at the Harvard laboratories and at Woods Hole, and an explanatory lecture from H. P. Bowditch, “the leader of American Physiologists,” would have astonished him. But, alas, some modern doctors wonder what recent research on plants, hydra, dogs, cats, or apes has to do with giving pills. Boston contains many able men who are devoting their lives to such work. Theobald Smith has already been referred to. H. P. Bowditch has made many new discoveries in the physiology of the heart, nerves, vision, etc. M. J. Rosenau has done like wise in anaphylaxis, vaccines, standardizing antitoxins, plague, tetanus, etc. W. T. Councilman has done the same for pathological anatomy, and the etiology of small-pox. F. B. Mallory has discovered

new methods of staining tissues to aid in research concerning them, and has increased our knowledge of typhoid fever, meningitis, and diphtheria. Among others whose work has aided medical progress are H. A. Christian in pulmonary embolisms, dermoid cysts, and leucocytoxins, R. C. Cabot in serum diagnosis and alcoholic arterio-sclerosis, T. Dwight in anatomical variation particularly of human bones, A. Cleghorn in the mechanism of respiration and the effects of fatigue products on the heart, T. Hough in fatigue and in cutaneous capillary pressure, W. B. Cannon on the mechanism of digestion and other physiological subjects, W. E. Castle in hybridism, heredity and animal dimorphism, and E. L. Mark on cytology as related to heredity. The number of these experimenters is growing rapidly and while but few of them give us epoch-making results all such work, if carefully and conscientiously done, forms a lever of great power in building up truth. The fad of considering experimental work as the all-in-all is, at present, the most dangerous disease that progressive humanity has to deal with. It is a brain virus that is distorting the mental vision of many great minds. Without the provision that comes from great laws and great principles, good as all this work is, we can safely pronounce it utter trash till brought into a comprehensive generalization. These many workers form but a fraction of the newer ones that our universities are turning out and careful as has been the effort of the writer at trying to get together all prominent ones it would be miraculous if we had succeeded perfectly. No one person can be sufficiently familiar with the various departments of research to be able to find them all. Enough have been given to add zest to our tour of America for medical readers. But such readers want more than such details of work. They want to know something of the great sights of the places visited and a visit to Boston that failed to tell of Bunker Hill Monument, the

harbor and its celebrated "tea party," Faneuil Hall, etc., would be like the play of Hamlet with Hamlet left out. Every doctor going there expects to see the old State House and its collection of antiquities, old South Church where the exciting meetings of revolutionary times were held and where now the revolutionary relics are kept, Christ Church from the belfry of which the lanterns were hung out for Paul Revere, Beacon Hill with its Boston State House, that figures as "The hub of the universe," and that overlooks the celebrated "Common" and the handsome public gardens, its 20 odd hospitals, 30 asylums and public homes, its museums, handsome public buildings, numerous parks, and quaint, crooked streets. There is a historic charm about Boston that no other city of our country has so that a medical tour of the world could end in no more appropriate place. We will then, for the present, bid the readers of the Medical Fortnightly a fond adieu and leave them visiting and studying the significance to themselves and others of America's "Cradle of Liberty."







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